Submitted Operating Test and Written Examination with NRC Comments

Contains the following:

Initial Submittal Cover Letter

ES-301-3 Operating Test Quality Checklist
ES-301-4 Simulator Scenario Quality Checklist
ES-401-7 Written Examination Quality Checklist (SRO)
ES-401-7 Written Examination Quality Checklist (RO)
ES-401-9 Written Examination Review Worksheet w/NRC Comments
Five (5) administrative job performance measures (RO) with NRC Comments
Five (5) administrative job performance measures (SRO) with NRC Comments
Ten (10) operating job performance measures (RO/SRO) with NRC Comments
Four (4) dynamic simulator scenario guides (ES-D-1 & ES-D-2) with NRC Comment
Written examination (129 questions are independently marked as RO/Both/SRO)
(pages 19, 125 & 128 were intentionally removed, as they contained no pertinent data)
(written examination comments are on the ES-401-9 form)

Facility: **BRAIDWOOD** Date of Examination: **10/15-29/01** Operating Test Number: **2001-01**

	1. GENERAL CRITERIA	Initials a	Initials b*	Initials c#
a.	The operating test conforms with the previously approved outline; changes are consistent with sampling requirements (e.g., 10 CFR 55.45, operational importance, safety function distribution).	SD	JEB	DM
b.	There is no day-to-day repetition between this and other operating tests to be administered during this examination.	SD	JEB	DM
c.	The operating test shall not duplicate items from the applicants' audit test(s)(see Section D.1.a).	SD	JEB	DM
d.	Overlap with the written examination and between operating test categories is within acceptable limits.	SD	JEB	DM
e.	It appears that the operating test will differentiate between competent and less-than-competent applicants at the designated license level.	SD	JEB	DM
	2. WALK-THROUGH (CATEGORY A & B) CRITERIA	--	--	--
a.	Each JPM includes the following, as applicable: · initial conditions · initiating cues · references and tools, including associated procedures · reasonable and validated time limits (average time allowed for completion) and specific designation if deemed to be time critical by the facility licensee · specific performance criteria that include: - detailed expected actions with exact criteria and nomenclature - system response and other examiner cues - statements describing important observations to be made by the applicant - criteria for successful completion of the task - identification of critical steps and their associated performance standards - restrictions on the sequence of steps, if applicable	SD	JEB	DM
b.	The prescripted questions in Category A are predominantly open reference and meet the criteria in Attachment 1 of ES-301.	SD	JEB	DM
c.	Repetition from operating tests used during the previous licensing examination is within acceptable limits (30% for the walk-through) and do not compromise test integrity.	SD	JEB	DM
d.	At least 20 percent of the JPMs on each test are new or significantly modified.	SD	JEB	DM
	3. SIMULATOR (CATEGORY C) CRITERIA	--	--	--
a.	The associated simulator operating tests (scenario sets) have been reviewed in accordance with Form ES-301-4 and a copy is attached.	SD	JEB	DM

	Printed Name / Signature	Date
a. Author	**Scott M. Deprest** / Scott M Deprest	9/28/01
b. Facility Reviewer(*)	**John E. Browning** / John E Browning	9/28/01
c. NRC Chief Examiner (#)	DELL R. MCNEIL / Dell R. McNeil	10/10/01
d. NRC Supervisor (*)	David E. Hills / David E. Hills	10/10/01

NOTE: * The facility signature is not applicable for NRC-developed tests
Independent NRC reviewer initial items in Column "c;" chief examiner concurrence is required.

Facility: **BRAIDWOOD** Date of Exam: **10/15-29/01** Scenario Numbers: **01, 02, 03, 04** Operating Test No.: **2001-01**

QUALITATIVE ATTRIBUTES		Initials a	Initials b*	Initials c#
1.	The initial conditions are realistic, in that some equipment and/or instrumentation may be out of service, but it does not cue the operators into expected events.			
2.	The scenarios consist mostly of related events.			
3.	Each event description consists of · the point in the scenario when it is to be initiated · the malfunction(s) that are entered to initiate the event · the symptoms/cues that will be visible to the crew · the expected operator actions (by shift position) · the event termination point (if applicable)			
4.	No more than one non-mechanistic failure (e.g., pipe break) is incorporated into the scenario without a credible preceding incident such as a seismic event.			
5.	The events are valid with regard to physics and thermodynamics.			
6.	Sequencing and timing of events is reasonable, and allows the examination team to obtain complete evaluation results commensurate with the scenario objectives.			
7.	If time compression techniques are used, the scenario summary clearly so indicates. Operators have sufficient time to carry out expected activities without undue time constraints. Cues are given.			N/A
8.	The simulator modeling is not altered.			
9.	The scenarios have been validated. Any open simulator performance deficiencies have been evaluated to ensure that functional fidelity is maintained while running the planned scenarios.			
10.	Every operator will be evaluated using at least one new or significantly modified scenario. All other scenarios have been altered in accordance with Section D.4 of ES-301.			
11.	All individual operator competencies can be evaluated, as verified using Form ES-301-6 (submit the form along with the simulator scenarios).			
12.	Each applicant will be significantly involved in the minimum number of transients and events specified on Form ES-301-5 (submit the form with the simulator scenarios).			
13.	The level of difficulty is appropriate to support licensing decisions for each crew position.			

TARGET QUANTITATIVE ATTRIBUTES (PER SCENARIO; SEE SECTION D.4.D)		Actual Attributes	--	--	--
1.	Total malfunctions (5-8)	**7 / 8 / 7 / 7**			
2.	Malfunctions after EOP entry (1-2)	**2 / 2 / 2 / 1**			
3.	Abnormal events (2-4)	**4 / 4 / 3 / 4**			
4.	Major transients (1-2)	**1 / 2 / 2 / 2**			
5.	EOPs entered/requiring substantive actions (1-2)	**2 / 1 / 2 / 1**			
6.	EOP contingencies requiring substantive actions (0-2)	**1 / 2 / 2 / 2**			
7.	Critical tasks (2-3)	**2 / 3 / 3 / 3**			

Facility: **BRAIDWOOD**	Date of Exam: **10/15-29/01**	Exam Level: **SRO**		
Item Description		Initial a	Initial b*	Initial c#
1. Questions and answers technically accurate and applicable to facility		SMD	JEB	DM
2. a. NRC K/As referenced for all questions b. Facility learning objectives referenced as available		SMD	JEB	DM
3. RO/SRO overlap is no more than 75 percent, and SRO questions are appropriate per Section D.2.d of ES-401		SMD	JEB	DM
4. Question section and duplication from the last two NRC licensing exams appears consistent with a systematic sampling process.				DM
5. Question duplication from the license screening/audit exam was controlled as indicated below (check the item that applies) and appears appropriate: __ the audit exam was systematically and randomly developed; or X_ the audit exam was completed before the license exam was started; or __ the examinations were developed independently; or __ the licensee certifies that there is no duplication; or __ other (explain)		SMD	JEB	DM
6. Bank use meets limits (no more than 75 percent from the bank at least 10 percent new, and the rest modified); enter the actual question distribution at right	Bank: 17; Modified: 11; New: 72	SMD	JEB	DM
7. Between 50 and 60 percent of the questions on the exam (including 10 new questions) are written at the comprehension/analysis level; enter the actual question distribution at right	Memory: 46; C/A: 54	SMD	JEB	DM
8. References/handouts provided do not give away answers		SMD	JEB	DM
9. Question content conforms with specific K/A statements in the previously approved examination outline and is appropriate for the Tier to which they are assigned; deviations are justified		SMD	JEB	DM
10. Question psychometric quality and format meet ES, Appendix B, guidelines		SMD	JEB	DM
11. The exam contains 100, one-point, multiple choice items; the total is correct and agrees with value on cover sheet		SMD	JEB	DM

	Printed Name / Signature	Date
a. Author	**Scott M. Depresť** / Scott M. Deprest	9/27/01
b. Facility Reviewer (*)	**John E. Browning** / John E. Browning	9/28/01
c. NRC Chief Examiner (#)	Dell R. McNeil / Dell R. McNeil	10/9/01
d. NRC Regional Supervisor	David E. Hills / David E. Hills	10/25/01

Note: * The facility reviewer's initials/signature are not applicable for NRC-developed examinations.
Independent NRC reviewer initial items in Column "c;" chief examiner concurrence required.

Facility: **BRAIDWOOD**	Date of Exam: **10/15-29/01**	Exam Level: **RO**		
	Item Description	**Initial a**	**b***	**c#**
1.	Questions and answers technically accurate and applicable to facility	SMD	JEB	DRM
2.	a. NRC K/As referenced for all questions b. Facility learning objectives referenced as available	SMD	JEB	DRM
3.	RO/SRO overlap is no more than 75 percent, and SRO questions are appropriate per Section D.2.d of ES-401	SMD	JEB	DRM
4.	Question section and duplication from the last two NRC licensing exams appears consistent with a systematic sampling process.			DRM
5.	Question duplication from the license screening/audit exam was controlled as indicated below (check the item that applies) and appears appropriate: __ the audit exam was systematically and randomly developed; or X_ the audit exam was completed before the license exam was started; or __ the examinations were developed independently; or __ the licensee certifies that there is no duplication; or _X other (explain) Audit re-exam was independently developed.	SMD	JEB	DRM
6.	Bank use meets limits (no more than 75 percent from the bank at least 10 percent new, and the rest modified); enter the actual question distribution at right — Bank: **19**, Modified: **12**, New: **69**	SMD	JEB	DRM
7.	Between 50 and 60 percent of the questions on the exam (including 10 new questions) are written at the comprehension/analysis level; enter the actual question distribution at right — Memory: **49**, C/A: **51**	SMD	JEB	DRM
8.	References/handouts provided do not give away answers	SMD	JEB	DRM
9.	Question content conforms with specific K/A statements in the previously approved examination outline and is appropriate for the Tier to which they are assigned; deviations are justified	SMD	JEB	DRM
10.	Question psychometric quality and format meet ES, Appendix B, guidelines	SMD	JEB	DRM
11.	The exam contains 100, one-point, multiple choice items; the total is correct and agrees with value on cover sheet	SMD	JEB	DRM

	Printed Name / Signature	Date
a. Author	**Scott M. Deprest /** Scott M Deprest	9/27/01
b. Facility Reviewer (*)	**John E. Browning /** [signature]	9/28/1
c. NRC Chief Examiner (#)	Dell R. McNeil / Dell R. McNeil	10/9/01
d. NRC Regional Supervisor	David E. Hills / David E Hills	10/25/01

Note: * The facility reviewer's initials/signature are not applicable for NRC-developed examinations.
\# Independent NRC reviewer initial items in Column "c;" chief examiner concurrence required.

INITIAL SUBMITTAL OF THE OPERATING TEST

FOR THE BRAIDWOOD INITIAL EXAMINATION - OCTOBER 2001

INITIAL SUBMITTAL OF ADMINISTRATIVE JPMS

WITH NRC COMMENTS

FOR THE BRAIDWOOD INITIAL EXAMINATION - OCTOBER 2001

JOB PERFORMANCE MEASURE

TASK TITLE: **Perform Calorimetric Using Process Plant Computer (w/o Channel Adjustment)**

JPM No.: **N-08** REV: 10

TPO No.: IV.C.NI-05 K&A No.: (015A1.01)

TASK No.: NI-004 K&A IMP: 3.5 /3.8

TRAINEE: ______________________________

EVALUATOR: ____________________________ DATE: ______________

The Trainee: PASSED __________ this JPM. TIME STARTED: __________________

FAILED __________ TIME FINISHED: __________________

CRITICAL ELEMENTS: **(*) 1-4** JPM TIME: _________ MINUTES

CRITICAL TIME: **NA** APPROX COMPLETION TIME **12** MINUTES

EVALUATION METHOD:
- X PERFORM
- ___ SIMULATE

LOCATION:
- ___ IN PLANT
- X SIMULATOR

GENERAL REFERENCES:

1. 1BwOSR 3.3.1.2-1, Rev. 6, Unit 1 Power Range High Flux Setpoint Daily Channel Calibration (Computer Calorimetric).

MATERIALS:

Copy of 1BwOSR 3.3.1.2-1, Plant Process Computer, transparent tape.

TASK STANDARDS:

1. Perform actions required to run calorimetric program on plant process computer.
2. Adjust NIs if necessary.
3. Demonstrates the use of good Core Work Practices (CWP).

TASK CONDITIONS:

1. You are an extra NSO.
2. The Unit is at 100% power, steady state.
3. Unit 2 is at 100% power.

INITIATING CUES:

1. You have been directed by the US to perform the calorimetric using the process computer per 1BwOSR 3.3.1.2-1.

PERFORMANCE CHECKLIST	STANDARDS	SAT	UNSAT	N/A

RECORD START TIME __________

Note: If asked at any time what the trend on computer points T8000-T8009 (Computer room temperatures), report that the temperatures are steady. If questioned about the Liebert Unit, report that it has been off line for 4 hours.

*1. Refer to 1BwOSR 3.3.1.2-1. **(CUE: After examinee locates procedure, provide a copy. If asked, all Prerequisites, Precautions, Limitations and Actions have been met.)**	Locate and refer to 1BwOSR 3.3.1.2-1. On Data Sheet D-2: o RECORD the date and time. o RECORD Gross MWe. o RECORD Control Bank Positions. o Sign for all prerequisites met. • RECORD the % Power from the NIS Drawers.	☐	☐	☐
*2. Access the Plant Process Computer Program for the Calorimetric.	Access the Plant Process Computer Program for the Calorimetric as follows: • SELECT OPCON (OTHER) page. • POSITION mouse cursor to within the black background area to enable keyboard function. • DEPRESS 'F8' (or click on 'MISC') button to select function menu. • Tab to Function Number field and TYPE '23'. • DEPRESS 'RETURN' (EXECUTE) key.	☐	☐	☐

PERFORMANCE CHECKLIST	STANDARDS	SAT	UNSAT	N/A
*3. Create Calorimetric report from the plant process computer. **(CUE: If asked cue long form and trend typer as output device.)** **(CUE: All blowdown flows are correct as entered.)** **(Note: It is not desired to perform an Appendix C Review of all manually entered process computer points.)** **(CUE: The quality of all values on the report are good.)**	Perform the following to create a Calorimetric Report from the plant process computer: • TYPE '2' as the time span for a 10 minute average. • TYPE '2' as the report format for a long output. • TYPE '2' for trend typer as the output device. • VERIFY each S/G loop blowdown flow. • DEPRESS 'RETURN' (EXECUTE). • REVIEW the printout percent power value for Quality.	☐	☐	☐
*4. Determine if an adjustment is required for each operable power range channel. **(CUE: All Block 11 values are positive numbers and less than 2%.)**	DETERMINE if an adjustment is required for each operable power range channel as follows: • RECORD percent power value for each operable channel from the printout in block 10. • DETERMINE the power difference by subtracting the calorimetric power from the NIS power for each channel and RECORD the results in block 11. • DETERMINE that NO adjustments are necessary because block 11 values for all channels are positive numbers less than 2%. • CHECK 'NO' boxes for each channel in block 12.	☐	☐	☐

PERFORMANCE CHECKLIST	STANDARDS	SAT	UNSAT	N/A
5. Attach the computer printout in the space provided on data sheet D-3 and indicate 'YES' in block 22. **(CUE: As SM, sign computer printout if asked.** **As US acknowledge completion of surveillance.)**	COMPLETE the Data sheets as follows: • Obtain Shift Manager's or designee's signature on the printout. • ATTACH the signed printout to data sheet D-3. • INDICATE 'YES' in both boxes of block 22. o Report completion of surveillance to US.	☐	☐	☐

(CUE:) THIS COMPLETES THIS JPM.

RECORD STOP TIME ______________________

COMMENTS:

JOB PERFORMANCE MEASURE

TASK TITLE: **Determine Shutdown Margin Inadequate from Calculation**

Need to expand out Ranges

JPM No.: **N-125** REV: 2

TPO No.: IV.C.GP-03 K&A No.: (001A4.11)

TASK No.: RK-005 K&A IMP: 3.5/4.1

TRAINEE: ______________________

EVALUATOR: ______________________ DATE: __________

The Trainee: PASSED ________ this JPM. TIME STARTED: ______________

FAILED ________ TIME FINISHED: ______________

CRITICAL ELEMENTS: **(*) 2-6** JPM TIME: ________ MINUTES

CRITICAL TIME: **N/A** APPROX COMPLETION TIME ~~16~~ 30 MINUTES

EVALUATION METHOD:

__X__ PERFORM

_____ SIMULATE

LOCATION:

_____ IN PLANT

__X__ SIMULATOR

GENERAL REFERENCES:

1. 1BwOSR 3.1.1.1-2, Rev. 1, Unit One Shutdown Margin Surveillance During Operation.
2. BwCB (Various), Braidwood Curve Book, Unit 1.
3. 1BwOL 3.1.4, LCOAR Rod Group Alignment Limits Tech Spec LCO 3.1.4 Rev. 2.

MATERIALS:

1. Copy of 1BwOSR 3.1.1.1-2.
2. BwCB (Various), Braidwood Curve Book, Unit 1.
3. Braidwood Technical Requirements Manual TRM

TASK STANDARDS:

1. Perform the required actions of 1BwOSR 3.1.1.1-2 Rev. 1, Unit 1 Shutdown Margin Surveillance During Operation ~~(within 20 minutes)~~.
2. Determine Shutdown Margin unacceptable for current plant conditions.
3. Demonstrates the use of good Core Work Practices (CWP).

TASK CONDITIONS:

1. You are an extra NSO.
2. The Unit is at 100% power with all control systems in automatic except rod control which is in manual.

INITIATING CUES:

1. 28 minutes ago it was determined rods M-4 and M-12 are inoperable and immovable due to excessive friction. The Qualified Nuclear Engineer is informed.
2. The US has directed you to perform 1BwOSR 3.1.1.1-2, per LCOAR 1BwOL 3.1.4. Condition A, Required Action A.1.1. and inform him of the results.

Note to EXAMINER: HAND OUT NR-1 and LCOAR Separately. See key for Ranges of acceptable Values

PERFORMANCE CHECKLIST	STANDARDS	SAT	UNSAT	N/A

Note to Evaluator: For either In Plant, or Simulator performance of this JPM, the Actual Shutdown Margin is to be calculated by the JPM Evaluator prior to JPM performance by the examinee. Fill in the Actual Values blanks with your pre-calculated data. KEY has ranges of acceptable values depending on graph interpretation.

Provide CUES ONLY if actual plant/ simulator conditions are not available.

RECORD START TIME ________

PERFORMANCE CHECKLIST	STANDARDS	SAT	UNSAT	N/A
1. Refer to 1BwOSR 3.1.1.1-2. **(CUE: After examinee locates correct procedure, provide a copy. All Prerequisites have been met.)**	Locate and Open 1BwOSR 3.1.1.1-2.	☐	☐	☐
*2. Document the "Present Conditions".	Determine and record the following:	☐	☐	☐
	• Date and Time (step F.1.a).			
(CUE: When asked, provide partially filled in NR-1. Core Average Burnup is 10000 EFPH.)	• Core Average Burnup from 1BwOS NR-1 (step F.1.b).			
Conversion factor is (EFPH X 1.8462) - 870.795.	o EFPH to MWD/MTU conversion factor from BwCB-1, Table 4-1 (step F.1.c).			
18462-870.795 = 17591.205 **MWD/MTU is 17591.205.**	o Convert Burnup in EFPH to Burnup in MWD/MTU by MULTIPLYING the present Core EFPH by the EFPH to MWD/MTU conversion factor (step F.1.d).			
Tave is 586 deg F.	o Core Average Temperature (step F.1.e).			
Reactor Power level is 100%.	• Power Level (step F.1.f).			
(CUE: RCS Boron is 325 ppm 1 hr ago, no changes since.)	• Present Boron Concentration (step F.1.g).			

PERFORMANCE CHECKLIST		STANDARDS	SAT	UNSAT	N/A
*3. Determine total worth due to rods.		Determine total worth due to rods and record the following:	☐	☐	☐
	(CUE: Control Bank D 215.)	• Control Bank position (step F.2.a).			
	Actual Value:________ **Examinee Value:______**	• Remaining worth of the Control Banks from BwCB-1 figure 2 or 2a based on recorded position in step F.2.a. (step F.2.b).			
	3041.5pcm - 10pcm = 3031.5pcm	• SUBTRACT the Control Bank remaining worth from the Control Bank total worth to obtain the total available worth due to Control Bank position. (step F.2.c).			
	3094.8pcm + 3031.5pcm = 6126.3pcm **Actual Value:________** **Examinee Value:______**	• ADD the Shutdown Bank worth (from BwCB-1, Table 4-1) plus the total available Control Bank worth (F.2.c.) and record the total worth due to rods (step F.2.d).			

PERFORMANCE CHECKLIST		STANDARDS	SAT	UNSAT	N/A
*4.	Determine actual reactivity available due to rods.	Determine and record actual reactivity due to rods as follows:	☐	☐	☐
	2	• Number of immovable or untrippable control rods (step F.3.a).			
	847.3pcm	• Highest stuck rod worth from BwCB-1 Table 4-1 (step F.3.b).			
	2 x 2000 = 4000	• MULTIPLY the number of immovable or untrippable control rods (step F.3.a) by 2000pcm (step F.3.c).			
	6126.3-4000-847.3 = 1279pcm **Actual Value:________** **Examinee Value:_______**	• Total rod worth (F.2.d) minus worth of immovable or untrippable rods (F.3.c.) minus highest stuck rod worth (F.3.b) = actual reactivity available due to rods (step F.3.d).			
*5.	Determine current Power Defect.	Determine and record the current power defect for this Boron Concentration and Power Level from either:	☐	☐	☐
	-2362pcm	○ Figure 17A or ○ Table 2-1			

PERFORMANCE CHECKLIST		STANDARDS	SAT	UNSAT	N/A
*6. Perform Shutdown Margin Verification.		VERIFY Shutdown Margin as follows:	☐	☐	☐
	1279pcm + (-) 2362pcm = -1083pcm	• ADD total corrected rod worth (F.3.d) to the power defect (F.4) (Step F.5.a).			
	1300pcm	• Record the Shutdown Margin Limit for Modes 1 and 2 from the COLR (step F.5.b).			
	-1083pcm $\leq$ 1300pcm **Actual Value:________** **Examinee Value:______**	• VERIFY the available shutdown reactivity recored in step F.5.a is geater than or equal to the minimum required Shutdown Margin Limit recorded in step F.5.b. (Step F.5.c).			
(CUE:	**As US acknowledge inadequate SDM and will take the appropriate actions.)**	• Inform US that Shutdown Margin is NOT met and LCOAR 1BwOL TRM 3.1.h needs to be initiated.			

(CUE:) THIS COMPLETES THIS JPM.

RECORD STOP TIME ____________________

COMMENTS:

JOB PERFORMANCE MEASURE

TASK TITLE: **Perform Offsite AC Power Availability Weekly Surveillance**

JPM No.: **N-75** REV: 6

TPO No.: IV.C.AP-04 K&A No.: (062K1.04)

TASK No.: AP-017 K&A IMP: 3.7/4.2

TRAINEE: ______________________________

EVALUATOR: ____________________________ DATE: ______________

The Trainee: PASSED __________ this JPM. TIME STARTED: __________________

FAILED __________ TIME FINISHED: __________________

CRITICAL ELEMENTS: **(*) 4** JPM TIME: _________ MINUTES

CRITICAL TIME: **NA** APPROX COMPLETION TIME **17** MINUTES 26

EVALUATION METHOD:

__X__ PERFORM

_____ SIMULATE

LOCATION:

_____ IN PLANT

__X__ SIMULATOR

GENERAL REFERENCES:

1. 1BwOSR 3.8.1.1 Rev. 0; Unit One Offsite AC Power Availability Weekly Surveillance.

MATERIALS:

Copy of 1BwOSR 3.8.1.1 Rev. 0; Unit One Offsite AC Power Availability Weekly Surveillance.

TASK STANDARDS:

1. Complete Surveillance 1BwOSR 3.8.1.1 Rev. 0; Unit One Offsite AC Power Availability Weekly Surveillance.
2. Demonstrates the use of good Core Work Practices (CWP).

TASK CONDITIONS:

1. You are an extra NSO.
2. The Unit is at 100% power.
3. Unit 2 is at 100% power.
4. Unit 2 4KV ESF buses are being supplied from Unit 2 SATs.
5. All Unit 2 Switchyard and 4KV breakers are available.

INITIATING CUES:

1. The 1A EDG has just been declared inoperable and the US has directed you to perform 1BwOSR 3.8.1.1 Rev. 0, Unit One Offsite AC Power Availability Weekly Surveillance, subsection F.1.0. Steps F.1.1 through F.1.16.

N-75(8/17/99)
ZD73EXAM

PERFORMANCE CHECKLIST	STANDARDS	SAT	UNSAT	N/A
RECORD START TIME ________				
1. Record Initial Data. **(CUE: All Prerequisites, Precautions, Limitations and Actions have been met.)**	On the Modes 1-4 Data Sheet, **RECORD:** Unit 1 Mode Unit 2 Mode	☐	☐	☐
2. Check 345 KV Transmission Line Status.	At 0PM03J, **OBSERVE:** AC amperes, MW, MVAR, and KV for All Lines.	☐	☐	☐
(CUE: All 345 KV Transmission Lines are energized.)	On the Modes 1-4 Data Sheet, **CIRCLE:** "ENERGIZED" for each: • Line 0104 • Line 2001 • Line 2002 • Line 0103 • Line 2003 • Line 2004	☐	☐	☐
3. Indicate all closed and open switchyard breakers **(CUE: All Swyd breakers indicate closed.)**	Check status of all 345 KV Swyd breakers On the Data Sheet Drawing of the 345 KV swyd, **INDICATE:** Closed breakers with 'X' Open breakers with 'O'	☐	☐	☐

PERFORMANCE CHECKLIST	STANDARDS	SAT	UNSAT	N/A
*4. Trace paths for independent power sources to the unit 1 and 2 SATs.	On the Data Sheet Drawing of the 345 KV Swyd, **TRACE:**			
	• Single path along the dashed lines from any energized offsite power source to the Unit 1 SAT banks.	☐	☐	☐
(**CUE:** **All 345 KV Transmission Lines are energized.**)	• Second path along the dashed lines from a second independent energized offsite power source to the Unit 2 SAT banks. (Can't retrace any portion of the first path)	☐	☐	☐
5. Verify two independent paths exist from offsite power sources to the Unit SAT banks. (Step 1.6)	On the Modes 1-4 Data Sheet, **VERIFY:** Two independent paths exist from the offsite power sources through the swyd to the UNIT SAT Banks.	☐	☐	☐
6. Verify Normal (Bus 4) and Alternate (Bus 14) power are energized. (**CUE:** **Bus 4 alive light is lit. Bus 14 bus alive light is lit. Bus voltage indicated on buses 4 and 14.**)	At 0PM03J, On the Modes 1-4 Data sheet, **OBSERVE and RECORD STATUS:** • Bus alive lights lit for buses 4 and 14. • Bus Voltmeter indications for buses 4 and 14. • Place 'Xs' under 'ENERGIZED' in step 1.7. • Place 'Xs' under 'YES' in steps 1.8 and 1.9.	☐	☐	☐

PERFORMANCE CHECKLIST	STANDARDS	SAT	UNSAT	N/A
7. Determine status of Normal and Alternate Power SATs. **(CUE: All X and Y windings for both SATs at each unit are energized.)**	At 1PM01J and 1PM02J, On the Modes 1-4 Data Sheet, **OBSERVE and RECORD STATUS:** • X or Y winding AC MW and AC amperes indications for each SAT at each unit. • Place X in 'ENERGIZED' column.	☐	☐	☐
8. Determine availability status of Normal and Alternate supply breakers to each unit 1 4160V ESF bus **(CUE: All normal ESF bus feed breakers indicate closed, all crosstie breakers are available.)**	On the Modes 1-4 Data Sheet, **OBSERVE and RECORD STATUS:** • ACB 1412 (X in Closed Box). • ACB 1414 (X in Avail Box). • ACB 2414 (X in Avail Box). • ACB 2412 (X in Closed Box). • ACB 1422 (X in Closed Box). • ACB 1424 (X in Avail Box). • ACB 2424 (X in Avail Box). • ACB 2422 (X in Closed Box).	☐	☐	☐
9. Determine supply configuration to the 4160V ESF buses **(CUE: All normal ESF bus feed breakers indicate closed, all crosstie breakers are available.)**	On the Modes 1-4 Data Sheet, **OBSERVE and RECORD STATUS:** • ESF BUS 141 (X in FROM SAT 142-1 box). • ESF Bus 142 (X in FROM SAT 142-2 box). • ESF BUS 241 (X in FROM SAT 242-1 box). • ESF BUS 242 (X in FROM SAT 242-2 box).	☐	☐	☐

PERFORMANCE CHECKLIST	STANDARDS	SAT	UNSAT	N/A
10. Determine capabilities of Unit 1 and Unit 2 SATs to supply Unit 1 ESF buses.	After Reviewing the staus of the sources and configuration, On the Modes 1-4 Data sheet, **RECORD STATUS:** • Unit 1 SAT capable of supplying bus 141 (X in 'YES' box). • Unit 2 SAT capable of supplying bus 141 (X in 'YES box). • Unit 1 SAT capable of supplying bus 142 (X in 'YES' box). • Unit 2 SAT capable of supplying bus 142 (X in 'YES' box).	☐	☐	☐

Cue: US will Verify Acc. Criteria

(CUE:) THIS COMPLETES THIS JPM.

RECORD STOP TIME ______________

COMMENTS:

JOB PERFORMANCE MEASURE

TASK TITLE: **Perform Local Start of CC HX Outlet Radiation Monitor (2PR09J)**

JPM No.: **N-133** REV: 3

TPO No.: IV.C.AR-03 K&A No.: (073A4.02)

TASK No.: AR-005 K&A IMP: 3.7/3.7

TRAINEE: ______________________________

EVALUATOR: ____________________________ DATE: ______________

The Trainee: PASSED __________ this JPM. TIME STARTED: __________________

FAILED __________ TIME FINISHED: __________________

CRITICAL ELEMENTS: **(*) 3,6** JPM TIME: _________ MINUTES

CRITICAL TIME: **NA** APPROX COMPLETION TIME **15** MINUTES

EVALUATION METHOD:

_____ PERFORM

__X__ SIMULATE

LOCATION:

__X__ IN PLANT

_____ SIMULATOR

GENERAL REFERENCES:

1. BwOP AR/PR-1, Rev. 10, Startup of Skid Mounted Process Radiation Monitors.

MATERIALS:

Copy of BwOP AR/PR-1; CAT-60 key.

TASK STANDARDS:

1. Locally startup 2PR09J per BwOP AR/PR-1.
2. Demonstrates the use of good Core Work Practices (CWP).

TASK CONDITIONS:

1. You are a Unit 2 Equipment Operator Nuclear (EON).
2. Both Units are at 100% power.
3. Maintenance has recently been performed on 2PR09J CC HX Outlet Radiation Monitor.
4. An attempt was made to start 2PR09J from the Control Room and failed.
5. Further discussion/investigation determined that there might be a problem with the alignment of the monitor.

INITIATING CUES:

per Step F.3.a

1. The WEC has directed you to start the 2PR09J locally per BwOP AR/PR-1. The US has verified the Monitor Data Base as correct for 2PR09J and has informed Rad Protection that you'll be performing BwOP AR/PR-1.

PERFORMANCE CHECKLIST	STANDARDS	SAT	UNSAT	N/A
RECORD START TIME ________				
1. Refer to BwOP AR/PR-1 ~~and determine step~~ F.3.a ~~is the appropriate step~~ for ~~startup of 2PR09J.~~ **(CUE: After examinee locates procedure, provide a copy. All Prerequisites, Precautions, Limitations and Actions have been met.)**	Locate and Open BwOP AR/PR-1 and determine step F.3.a is the appropriate step for startup of 2PR09J.	☐	☐	☐
2. Verify the Hand/Off/Auto switch is in the Off position. **(CUE: Hand/Off/Auto switch is in OFF position.)**	Determine the Sample Pump Control Switch position as follows: • VERIFY/PLACE the HAND/OFF/AUTO switch in the OFF position.	☐	☐	☐
*3. Place the local main power disconnect switch in the on position. **(CUE: Disconnect switch is in OFF position until examinee simulates placing it in ON position. Examinee may contact control room prior to energizing skid, if so acknowledge.)**	VERIFY power available to the skid as follows: • PLACE the LOCAL MAIN POWER DISCONNECT Switch in the ON position.	☐	☐	☐

N-133 (6/27/01)
ZD73EXAM

PERFORMANCE CHECKLIST	STANDARDS	SAT	UNSAT	N/A
4. Check the status of the circuits inside the RM-80 cabinets.	CHECK the status of the circuits inside the RM-80 cabinets as follows:	☐	☐	☐
(CUE: Examinee should open door and check lights. Provide cue only if opening door is prohibited by plant conditions:		get a picture of inside the cabinet.		
Green GO LED is flashing.	• GREEN 'GO' LED is FLASHING.			
Red NO GO LED is off.	• RED 'NO GO' LED is OFF.			
Red LOSS OF COUNTS LED is off.)	• RED 'LOSS OF COUNTS' LED is OFF.			
5. Determine that the monitor data base is correct.	CHECK the MONITOR DATA BASE is correct as follows:	☐	☐	☐
	• Determines from the initiating cue that the Monitor Data Base is correct.			

ote: The switch in the next JPM step is the same switch that was manipulated to OFF in JPM step 2.

PERFORMANCE CHECKLIST	STANDARDS	SAT	UNSAT	N/A
*6. Place the sample pump control switch in the Auto position.	VERIFY/PLACE the HAND/OFF/AUTO switch for the Sample Pump in the AUTO position.	☐	☐	☐
(CUE: HAND/OFF/AUTO switch for the sample pump is in AUTO position. If asked, Green light is lit.)				

PERFORMANCE CHECKLIST	STANDARDS	SAT	UNSAT	N/A
7. Check if Sample Pump is running. **(Note: Sample pump should be running and you will be able to see Amps/flow, feel air circulation and feel vibration of the pump.)** **(CUE: Indications are as you see them at the skid. If asked as U-2 NSO, report flow light is lit on 2PR09J.)**	CHECK if Sample Pump is RUNNING (determines step F.3.a.8 is not required).	☐	☐	☐
8. Check instrument available light is on at the RM-80 door. **(CUE: Instrument available light is lit.)**	CHECK that the INSTRUMENT AVAILABLE light on the door of the RM-80 is ON.	☐	☐	☐
9. Check that the monitor status is normal operating condition. **(CUE: As U-2 NSO, report that the 2PR09J is operating properly.)**	CHECK that the Monitor Status is NORMAL OPERATING CONDITION as follows: • Contacts NSO in control room to verify normal operating condition of monitor.	☐	☐	☐
10. Complete the Electrical lineup per BwOP AR/PR-E4. **(CUE: Electrical lineup is being completed by another operator.)**	Complete the electrical line up per BwOP AR/PR-E4.	☐	☐	☐

(CUE:) THIS COMPLETES THIS JPM.

RECORD STOP TIME ____________________

COMMENTS:

JOB PERFORMANCE MEASURE

TASK TITLE: **Activate the Emergency Response Data System (ERDS).**

JPM No.: **N-160** REV: 0

TPO No.: IV.F.ZP-04 K&A No.: (2.4.29)

TASK No.: ZP-007 K&A IMP: 2.6 / 4.0

TRAINEE: ____________________

EVALUATOR: ____________________ DATE: __________

The Trainee: PASSED ________ this JPM. TIME STARTED: ____________

FAILED ________ TIME FINISHED: ____________

CRITICAL ELEMENTS: (*) 2,3 JPM TIME: ________ MINUTES

CRITICAL TIME: **N/A** APPROX COMPLETION TIME ~~5~~ 11 MINUTES

EVALUATION METHOD:
X PERFORM
___ SIMULATE

LOCATION:
___ IN PLANT
X SIMULATOR

GENERAL REFERENCES:

1. EP-AA-114, Notifications, Attachment 8, ERDS Activation, Rev.0.

MATERIALS: Copy of EP-AA-114, Attachment 8.
PC with GSEP Program Group/ Suite.

TASK STANDARDS:

1. Activate the electronic data link (ERDS).
2. Demonstrates the use of good Core Work Practices.

TASK CONDITIONS:

1. You are an extra NSO.
2. The Emergency Response Data System (ERDS) is not yet activated.

INITIATING CUES:

1. Plant conditions changed resulting in an upgrade of the Emergency classification from Unusual Event to Alert.
2. The Shift Manager has directed you to activate the Emergency Response Data System per EP-AA-114 for Unit 1. per Att. 8

EXAMINERS NOTE: ~~To prevent actual activation of the ERDS, when the Examinee gets to the point of selecting~~ DO NOT allow Examinee to Select REAL mode. (~~Ere~~ See note next page).

PERFORMANCE CHECKLIST	STANDARD	SAT	UNSAT	N/A

RECORD START TIME ________

Note: To prevent actual activation of the ERDS, when the examinee gets to the point of selecting the mode (REAL, SIMULATOR, or EXERCISE) for ERDS activation from ~~the GSEP Suite, ask which~~ mode he would select. (Correct answer is REAL) Cue the examinee to select SIMULATOR.

	PERFORMANCE CHECKLIST	STANDARD	SAT	UNSAT	N/A
1.	Refer to EP-AA-114, Attachment 8.	Locate and Open • EP-AA-114, Attachment 8.	☐	☐	☐
*2.	Refer to EP-AA-114, Attachment 8. **(CUE: Ask which mode examinee intends to select prior to actual selection, cue per above note.)**	Perform the following from PC keyboard: • START MENU • Gate APPS • GSEP SUITE Rev 2.2 • ANSWER Question REAL • SELECT SIMULATOR	☐	☐	☐
*3.	Select ERDS Icon.	Perform the following to activate ERDS: • SELECT ERDS Icon • At the next screen, SELECT Braidwood Station. • Click OK. • At the next screen, enter the password "SCOUT". • Click OK. • Compare the status of ERDS programs on the screen to verify ERDS is on for the appropriate unit(s). • Click "TURN ON" button for Unit 1.	☐	☐	☐

(CUE:) THIS COMPLETES THIS JPM.

RECORD STOP TIME ________

COMMENTS:

JOB PERFORMANCE MEASURE

TASK TITLE: **Review Calorimetric Surveillance**

JPM No.: **S-42**

REV: 1

TPO No.: IV.C.NI-05

K&A No.: (015A1.01)

TASK No.: NI-004

K&A IMP: 3.5 /3.8

TRAINEE: ____________________________

EVALUATOR: ____________________________

DATE: ______________

The Trainee: PASSED __________ this JPM.

FAILED __________

TIME STARTED: __________________

TIME FINISHED: __________________

CRITICAL ELEMENTS: **(*) 3, 4**

JPM TIME: _________ MINUTES

CRITICAL TIME: **NA**

APPROX COMPLETION TIME **10** MINUTES

EVALUATION METHOD:
X PERFORM
_____ SIMULATE

LOCATION:
_____ IN PLANT
X SIMULATOR

GENERAL REFERENCES:

1. 1BwOSR 3.3.1.2-1, Rev. 6, Unit 1 Power Range High Flux Setpoint Daily Channel Calibration (Computer Calorimetric).

MATERIALS:

Copy of Completed/Ready for review 1BwOSR 3.3.1.2-1.

TASK STANDARDS:

1. Perform review of calorimetric data collected by NSO.
2. Determine if adjustment of NIs is necessary.
3. Demonstrates the use of good Core Work Practices (CWP).

TASK CONDITIONS:

1. You are the Unit Supervisor.
2. The Unit is at 100% power, steady state.
3. Unit 2 is at 100% power.

INITIATING CUES:

1. The Unit NSO has completed the required calorimetric surveillance and has asked for your review.

Note: Hand examinee completed calorimetric D-2 data sheet #1, with the 4 page printout of the calorimetric results from the JPM. (pages 7-10)

PERFORMANCE CHECKLIST	STANDARDS	SAT	UNSAT	N/A

RECORD START TIME ________

Note: This JPM is performed by having the examinee review the D-2 Data sheet from the surveillance. The first data sheet is complete through block 12 but has 1 mistake in it. The examinee must locate the mistake to pass the JPM prior to signing block 16, Review Authorization.

1. Refer to completed 1BwOSR 3.3.1.2-1. (**CUE:** **Ensure D-2 Data Sheet #1 is handed to examinee with the printout of the calorimetric data.)**	Review the data sheet for completeness/errors for blocks 1 and 2: • Date: Today • Time: 10 minutes ago • Mwe Gross: Current (1257.0) • Control Bank Position: Current for C1 (228), C2 (228), D1 (215), D2 (215). • NSOs Signature.	☐	☐	☐
2. Review blocks 3 and 10.	Review blocks 3 and 10 for completeness/errors: • Initial NIS Drawer Front Panel Meter Power filled in. • Calculated Calorimetric Power from printout filled in.	☐	☐	☐

PERFORMANCE CHECKLIST		STANDARDS	SAT	UNSAT	N/A
*3.	Review the Calculated power difference and determines channel N-4 ~~exceeds 2%~~. is negative.	Review the data in block 11 and 12, and determines 1 mistake exists: • Check absolute difference between data in blocks 3 and 10. • Determine N-4 absolute difference ~~exceeds 2%~~. is negative	☐	☐	☐
(Note:	**If examinee discovers the N-4 mistake, and either wants the NSO to complete boxes 13-15 or wants to do it himself, cue the examinee that the data has been taken and hand him D-2 data sheet #2. Go to JPM step 4.** **If at any time before the examinee signs the Review Authorization block 16, he discovers he missed the mistake, then treat it like he had discovered the mistake, and provide D-2 data sheet #2, after he states boxes 13-15 need to be filled in.)**	• Correct block 11 for calculated power difference for N-4. Line-out, date and initial or have the NSO correct/re-do it. • Correct block 12 for N-4 to a "YES" box for requiring channel adjustments. Line-out, date and initial or have the NSO correct/re-do it.			

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PERFORMANCE CHECKLIST	STANDARDS	SAT	UNSAT	N/A
*4. Verify the calculation that determines to what power N-44 must be adjusted. **(Note: The examinee will have been given a D-2 data sheet in the previous step, with the appropriate boxes 13-15 numbers filled in. He needs to verify the subtraction and determination of the indicated power the adjustments must result in for N-44.)** **(CUE: Adjustments to N-44 complete. Hand D-2 data sheet #3 to examinee.)** **(Note: If the examinee has NOT identified and corrected the mistake (N-42) by the time he signs Block 16, "Review Authorization", then the JPM performance is UNSAT.)**	DETERMINE the power channel N-44 needs to be adjusted to as follows: • Ensure the present percent power values are filled in block 13. • VERIFY the corrected calculated power difference from block 11 in block 14. • VERIFY/SUBTRACT the power difference from the present indicated power and the value as the Power to adjust the NIS channels to in block 15. • Direct the NSO to make adjustments to N-44. • Sign the "Review Authorization", block 16. • Review the printout and check box 22.a. "YES".	☐	☐	☐

(CUE:) THIS COMPLETES THIS JPM.

RECORD STOP TIME ______________________

COMMENTS:

S-42 (7/3/01)
ZD73EXAM

JOB PERFORMANCE MEASURE

TASK TITLE: **Determine Shutdown Margin Incorrectly Calculated and Inadequate**

JPM No.: **S-43** REV: 0

TPO No.: IV.C.GP-03 K&A No.: (001A4.11)

TASK No.: RK-005 K&A IMP: 3.5/4.1

TRAINEE: ____________________

EVALUATOR: ____________________ DATE: __________

The Trainee: PASSED ________ this JPM. TIME STARTED: __________

FAILED ________ TIME FINISHED: __________

CRITICAL ELEMENTS: **(*) 5** JPM TIME: ________ MINUTES

CRITICAL TIME: **N/A** APPROX COMPLETION TIME **16** MINUTES

EVALUATION METHOD:
X PERFORM
___ SIMULATE

LOCATION:
___ IN PLANT
X SIMULATOR

GENERAL REFERENCES:

1. 1BwOSR 3.1.1.1-2, Rev. 1, Unit One Shutdown Margin Surveillance During Operation.
2. BwCB (Various), Braidwood Curve Book, Unit 1.
3. 1BwOL 3.1.4, LCOAR Rod Group Alignment Limits Tech Spec LCO 3.1.4 Rev. 2.

MATERIALS:

1. Copy of completed 1BwOSR 3.1.1.1-2.
2. BwCB (Various), Braidwood Curve Book, Unit 1.
3. Braidwood Technical Requirements Manual TRM

TASK STANDARDS:

1. Review for completeness/correctness 1BwOSR 3.1.1.1-2 Rev. 1, Unit 1 Shutdown Margin Surveillance During Operation (within 20 minutes).
2. Determine Shutdown Margin was incorrectly calculated and is unacceptable for current plant conditions.
3. Demonstrates the use of good Core Work Practices (CWP).

TASK CONDITIONS:

1. You are Unit Supervisor on the unit.
2. The Unit is at 100% power with all control systems in automatic except rod control which is in manual.

INITIATING CUES:

1. 40 minutes ago it was determined rods M-4 and M-12 are inoperable and immovable due to excessive friction. The Qualified Nuclear Engineer is informed.
2. The NSO has completed 1BwOSR 3.1.1.1-2, per LCOAR 1BwOL 3.1.4. Condition A, Required Action A.1.1. and has given it to you for review. No other NSOs are available at this time.
3. Review the completed surveillance and inform the Shift Manager of the results.

Note to Evaluator: For either In Plant, or Simulator performance of this JPM, the Actual Shutdown Margin is to be calculated by the JPM Evaluator prior to JPM performance by the examinee. Fill in the Actual Values blanks with your pre-calculated data.

Provide CUES ONLY if actual plant/ simulator conditions are not available.

RECORD START TIME ________

PERFORMANCE CHECKLIST	STANDARDS	SAT	UNSAT	N/A
1. Reviews the completed 1BwOSR 3.1.1.1-2.	Reviews the following:	☐	☐	☐
	• Date and Time (step F.1.a).			
(CUE: Provide partially filled in NR-1 if asked. Core Average Burnup is 10000 EFPH.)	• Core Average Burnup from 1BwOS NR-1 (step F.1.b).			
	○ EFPH to MWD/MTU conversion factor from BwCB-1, Table 4-1 (step F.1.c).			
Conversion factor is (EFPH X 1.8462) - 870.795. **18462-870.795= 17591.205.** **MWD/MTU is 17591.205.**	○ Convert Burnup in EFPH to Burnup in MWD/MTU by MULTIPLYING the present Core EFPH by the EFPH to MWD/MTU conversion factor (step F.1.d).			
Tave is 586 deg F.	○ Core Average Temperature (step F.1.e).			
Reactor Power level is 100%.	• Power Level (step F.1.f).			
(CUE: RCS Boron is 325 ppm 1 hr ago, no changes since.)	• Present Boron Concentration (step F.1.g).			

PERFORMANCE CHECKLIST	STANDARDS	SAT	UNSAT	N/A
2. Reviews/Determines total worth due to rods.	Reviews/Determines total worth due to rods and checks the following recorded:	☐	☐	☐
(CUE: Control Bank D 215.)	• Control Bank position (step F.2.a).			
Actual Value:________ **Examinee Value:_______**	• Remaining worth of the Control Banks from BwCB-1 figure 2 or 2a based on recorded position in step F.2.a. (step F.2.b).			
3041.5pcm - 10pcm = 3031.5pcm	• SUBTRACT the Control Bank remaining worth from the Control Bank total worth to obtain the total available worth due to Control Bank position. (step F.2.c).			
3094.8pcm + 3031.5pcm = 6126.3pcm **Actual Value:________** **Examinee Value:_______**	• ADD the Shutdown Bank worth (from BwCB-1, Table 4-1) plus the total available Control Bank worth (F.2.c.) and record the total worth due to rods (step F.2.d).			

PERFORMANCE CHECKLIST		STANDARDS	SAT	UNSAT	N/A
3.	Reviews/Determines actual reactivity available due to rods.	Reviews/Determines and checks actual reactivity due to rods recorded as follows:	☐	☐	☐
	2	• Number of immovable or untrippable control rods (step F.3.a).			
	847.3pcm	• Highest stuck rod worth from BwCB-1 Table 4-1 (step F.3.b).			
	2 x 2000 = 4000	• MULTIPLY the number of immovable or untrippable control rods (step F.3.a) by 2000pcm (step F.3.c).			
	6126.3-4000-847.3 = 1279pcm **Actual Value:________** **Examinee Value:_______**	• Total rod worth (F.2.d) minus worth of immovable or untrippable rods (F.3.c.) minus highest stuck rod worth (F.3.b) = actual reactivity available due to rods (step F.3.d).			
4.	Review/Determine current Power Defect. **-2362pcm**	Using either: o Figure 17A or o BwCB Table 2-1 Reviews the current power defect for this Boron Concentration and Power Level.	☐	☐	☐

PERFORMANCE CHECKLIST	STANDARDS	SAT	UNSAT	N/A
*5. Perform Shutdown Margin Verification. **(Note: Examinee must identify mistake in this calculation. The power defect is a negative value. The mistake is the NSO added the absolute value of the power defect, instead of subtracting it. Step 5.a.** **1279pcm + (-) 2362pcm = -1083pcm**	Performs the following to review the Shutdown Margin VERIFICATION as follows: • ADD total corrected rod worth (F.3.d) to the power defect (F.4) (Step F.5.a).	☐	☐	☐
1300pcm	• Record the Shutdown Margin Limit for Modes 1 and 2 from the COLR (step F.5.b).			
-1083 ≤ 1300pcm **Actual Value:________** **Examinee Value:______**	• VERIFY the available shutdown reactivity recorded in step F.5.a is greater than or equal to the minimum required Shutdown Margin Limit recorded in step F.5.b. (Step F.5.c).			
(CUE: As SM acknowledge inadequate SDM and will take the appropriate actions.)	• Inform SM that Shutdown Margin is NOT met and LCOAR 1BwOL TRM 3.1.h needs to be initiated.			

(CUE:) THIS COMPLETES THIS JPM.

RECORD STOP TIME ____________________

COMMENTS:

JOB PERFORMANCE MEASURE

TASK TITLE: **Review Offsite AC Power Availability Weekly Surveillance**

JPM No.: **N-75a** REV: 6

TPO No.: IV.C.AP-04 K&A No.: (062K1.04)

TASK No.: AP-017 K&A IMP: 3.7/4.2

TRAINEE: ____________________

EVALUATOR: ____________________ DATE: __________

The Trainee: PASSED ________ this JPM.

FAILED ________

TIME STARTED: __________

TIME FINISHED: __________

CRITICAL ELEMENTS: **(*) 4**

JPM TIME: ________ MINUTES

CRITICAL TIME: **NA**

APPROX COMPLETION TIME **7** MINUTES

EVALUATION METHOD:
X PERFORM
____ SIMULATE

LOCATION:
____ IN PLANT
X SIMULATOR

GENERAL REFERENCES:

1. 1BwOSR 3.8.1.1 Rev. 0; Unit One Offsite AC Power Availability Weekly Surveillance.

MATERIALS:

Copy of completed 1BwOSR 3.8.1.1 Rev. 0; Unit One Offsite AC Power Availability Weekly Surveillance.

TASK STANDARDS:

1. Review the completed surveillance 1BwOSR 3.8.1.1 Rev. 0; Unit One Offsite AC Power Availability Weekly Surveillance and determine it does not meet acceptance criteria.
2. Demonstrates the use of good Core Work Practices (CWP).

TASK CONDITIONS:

1. You are the Unit 1 Unit Supervisor.
2. Unit 1 is at 100% power.
3. Unit 2 is at 100% power.
4. Unit 2 4KV ESF buses are being supplied from Unit 2 SATs.
5. All Unit 2 Switchyard and 4KV breakers are available.

INITIATING CUES:

1. The 1A EDG has just been declared inoperable and you directed the NSO to perform 1BwOSR 3.8.1.1 Rev. 0, Unit One Offsite AC Power Availability Weekly Surveillance, subsection F.1.0 Steps F.1.1 thru Steps F.1.16. He has just handed you the surveillance for your review. YOU ARE TO CONDUCT the UNIT Supervisor Review.

N-75a (7/3/01)
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PERFORMANCE CHECKLIST	STANDARDS	SAT	UNSAT	N/A
RECORD START TIME ________				

Note: Provide cues only if not performing in the simulator.

1. Review Initial Data. **(CUE: All Prerequisites, Precautions, Limitations and Actions have been met.)**	On the Modes 1-4 Data Sheet, **REVIEW:** Unit 1 Mode Unit 2 Mode	☐	☐	☐
2. Review/Check 345 KV Transmission Line Status.	On the Modes 1-4 Data Sheet 345KV Swyd drawing (page D-6), **REVIEW:** "ENERGIZED" for each: • Line 0104 • Line 2001	☐	☐	☐
(CUE: All 345 KV Transmission Lines are energized.)	• Line 2002 • Line 0103 • Line 2003 • Line 2004	☐	☐	☐
3. Review the surveillance to indicate all closed and open switchyard breakers **(CUE: All Swyd breakers indicate closed.)**	Check status of all 345 KV Swyd breakers On the Data Sheet Drawing of the 345 KV swyd, **REVIEW:** Closed breakers with 'X' Open breakers with 'O'	☐	☐	☐

N-75a(7/3/01)
ZD73EXAM

PERFORMANCE CHECKLIST	STANDARDS	SAT	UNSAT	N/A
*4. Review the paths traced for independent power sources to the Unit 1 and 2 SATs.	On the Data Sheet Drawing of the 345 KV Swyd, **REVIEW:**			
	• Single path along the dashed lines from any energized offsite power source to the Unit 1 SAT banks.	☐	☐	☐
(Note: Examinee must identify the fact that the selected lines are on the same tower and per the note, this is what makes the acceptance criteria NOT met. If the examinee does NOT identify the mistake, he fails this JPM. If he signs the cover sheet without comment signifying it is UNSAT, then the examinee has failed the JPM.)	• Second path along the dashed lines from a second independent energized offsite power source to the Unit 2 SAT banks. (Can't retrace any portion of the first path) o Return the Surveillance to the NSO to re-do/correct.	☐	☐	☐

(CUE:) THIS COMPLETES THIS JPM.

RECORD STOP TIME ________________________

COMMENTS:

JOB PERFORMANCE MEASURE

TASK TITLE: **Review a Liquid Release Package.**

JPM No.: **S-41** REV: 0

TPO No.: VIII.C.HP-001 K&A No.: (G2.3.6)

TASK No.: S-HP-001 K&A IMP: 2.1 / 3.1

TRAINEE: ______________________________

EVALUATOR: ____________________________ DATE: ______________

The Trainee: PASSED __________ this JPM. TIME STARTED: ____________________

FAILED __________ TIME FINISHED: ____________________

CRITICAL ELEMENTS: **(*) 3** JPM TIME: __________ MINUTES

CRITICAL TIME: **N/A** APPROX COMPLETION TIME **10** MINUTES

EVALUATION METHOD:

__X__ PERFORM
_____ SIMULATE

LOCATION:

_____ IN PLANT
__X__ SIMULATOR

GENERAL REFERENCES:

1. BwOP WX-501T1, Rev. 15, "Liquid Release Tank 0WX01T release Form."
2. BwOP WX-501T2, Rev. 3, "Release Time Table."
3. Release Calculation form.

MATERIALS: Copy of BwOP WX-501T1 (filled in through step E.9).

TASK STANDARDS:

1. Complete applicable portions of steps E.10, and Section F of BwOP WX-501T1.
2. Demonstrates the use of good Core Work Practices.

TASK CONDITIONS:

1. You are the Control Room Supervisor.
2. All plant systems and controls are normal for the current plant conditions.

INITIATING CUES:

1. Liquid Release package paperwork L-01-042 is complete through step E.9, and is ready for your review.
2. The SM has directed you to complete sections E and F as applicable, and then inform the SM of the results of your review.

Note: Hand the partially completed package to the examinee.

PERFORMANCE CHECKLIST	STANDARDS	SAT	UNSAT	N/A
RECORD START TIME ________				
1. Refer to partially completed BwOP WX-501T1, Section E.10. **(CUE:**	Reads Step E.10, notices no signature (yet) and turns back to beginning of section E (page 18).	☐	☐	☐
2. Reviews steps E.1-5. **(CUE:**	Reviews steps E.1-5: • Step 1 initialed. • Step 2 initialed and Low Flow circled. • Steps 3a and 3b initialed and values filled in for alarm setpoints. • Steps 4a and 4b initialed and values filled in for alarm setpoints. • Steps 5a, 5b, and 5c initialed.	☐	☐	☐
*3. Determines step E.6, should be complete and is not initialed. (CUE: **As SM, ask what is wrong with the paperwork. After the examinee states the interlock check for the low flow release path was not performed, conclude the JPM.**	Reviews step E.6 and determines release may not be performed: • Step 6 not initialed as performed. • Informs SM release paperwork not completed properly. • Does NOT sign step E.10. • Does NOT sign step F.1.	☐	☐	☐

(CUE:) THIS COMPLETES THIS JPM.

RECORD STOP TIME ________

COMMENTS:

JOB PERFORMANCE MEASURE

TASK TITLE: **Perform Transfer of Command and Control to the TSC.**

JPM No.: **S-40** REV: 0

TPO No.: VII.F.ZP-022-A K&A No.: (2.4.38)

TASK No.: S-ZP-022 K&A IMP: 2.2 / 4.0

TRAINEE: ______________________________

EVALUATOR: ____________________________ DATE: ______________

The Trainee: PASSED __________ this JPM. TIME STARTED: __________________

FAILED __________ TIME FINISHED: __________________

CRITICAL ELEMENTS: **(*) 1-5** JPM TIME: _________ MINUTES

CRITICAL TIME: **N/A** APPROX COMPLETION TIME **9** MINUTES

EVALUATION METHOD:
__X__ PERFORM
_____ SIMULATE

LOCATION:
_____ IN PLANT
__X__ SIMULATOR

GENERAL REFERENCES:

1. EP-AA-112 Emergency Response Organization (ERO)/ Emergency Response Facility (ERF) Activation and Operation, Attachment 5 Command and Control Turnover Briefing Form, Rev. 1.

MATERIALS: Copy of EP-AA-112 Attachment 5.

TASK STANDARDS:

1. Fill out and perform the turnover of Command and Control to the TSC in accordance with Attachment 5 of EP-AA-112.
2. Demonstrates the use of good Core Work Practices.

TASK CONDITIONS:

1. You are the Shift Manager / Acting Station Director.
2. Perform the turnover of Command and Control to the TSC during a Site Emergency.

INITIATING CUES:

1. Unit 1 is in an emergency situation resulting in a reactor trip and safety injection. Conditions have degraded and you declared a Site Emergency under EAL FS1 30 minutes ago.
2. Entry into 1BwFR-H.1, "Loss of Secondary Heat Sink" has been entered and implemented.
3. The TSC is fully activated and ready in all aspects to assume Command and Control. A rough log has been kept.

te: Hand copy of rough log and partially completed Acting Station Director Checklist to aminee.

PERFORMANCE CHECKLIST	STANDARDS	SAT	UNSAT	N/A

RECORD START TIME ________

Note: Use the KEY to evaluate the information transmitted to the TSC to effect the turnover.

*1. Refer to EP-AA-112 Attachment 5. **(CUE: After locating Attachment 5, provide a copy.)** **(Note: Information to fill out the turnover form is available from the rough log. No cues need be given.)**	Locate and Open EP-AA-112 Attachment 5 and fill out the following information: • Current Classification EAL. • Time. • Unit. • Conditions met to determine this classification. • Utility Message # • State Message # • Time for both • Latest ENS Time	☐	☐	☐
*2. Perform turnover. **(CUE: As communicator in the TSC, answer YES to each of the parts of question #3 on the turnover form.)**	Determines TSC ready to perform non-delegable functions (Circles YES for each on form): • Classify events. • Determine PARs and make notifications. • Authorize exposures beyond 10CFR20 limits. • Authorize use of thyroid blocking agents.	☐	☐	☐
*3. Determines TSC will perform NARS, ENS, HPN, and environs Teams. **(CUE: As a communicator in the TSC, if asked you'll perform the NARS, ENS, HPN and Environs Teams reply yes.)**	Upon transfer of command and control, determines TSC will perform the following functions (Circles TSC for each on form): • NARS • ENS • HPN • Environs Teams.	☐	☐	☐

PERFORMANCE CHECKLIST	STANDARDS	SAT	UNSAT	N/A
*4. Transfers other pertinent information. **(CUE: As a communicator in the TSC, acknowledge the information transferred from the control room for question #5 on the form. Do NOT provide answers, only acknowledge what is said.)**	Transfers other pertinent information: • ERDS Activated (YES) • In-plant Teams (YES) • Assembly (YES) • Rad Concerns (NO) • Offsite Assistance Requested (NO) • Evacuation (NO)	☐	☐	☐
*5. Determines TSC has Command and Control.	Determines TSC has Command and Control: • Ready to receive Command and Control (Circles TSC and YES). • Command and Control transferred (Circles TSC, and logs Time.) • Acknowledges TSC has command and control. o Announces transfer to control room team.	☐	☐	☐

~UE:) THIS COMPLETES THIS JPM.

RECORD STOP TIME ___________

COMMENTS:

INITIAL SUBMITTAL OF WALKTHROUGH JPMS

WITH NRC COMMENTS

FOR THE BRAIDWOOD INITIAL EXAMINATION - OCTOBER 2001

JOB PERFORMANCE MEASURE

TASK TITLE: **Perform 50 PPM Boron Dilution with a Failure of 1CV111A**

JPM No.: **N-26** REV: 9

TPO No.: IV.C.CV-04 K&A No.: (004A4.07)

TASK No.: CV-003 K&A IMP: 3.9/3.7

TRAINEE: ______________________

EVALUATOR: ______________________ DATE: __________

The Trainee: PASSED ________ this JPM. TIME STARTED: __________

FAILED ________ TIME FINISHED: __________

CRITICAL ELEMENTS: (*) 2-~~8~~ 9 JPM TIME: ________ MINUTES

CRITICAL TIME: **NA** APPROX COMPLETION TIME ~~23~~ 30 MINUTES

EVALUATION METHOD:
__X__ PERFORM
_____ SIMULATE

LOCATION:
_____ IN PLANT
__X__ SIMULATOR

GENERAL REFERENCES:

1. BwOP CV-5, Rev. 13, Operation of the Reactor Makeup System in the Dilute/ Alternate Dilute/ Batch Dilution Mode.
2. BwCB Table 3-1, Rev. 3, pg 60, Boration/Dilution Tables for 557 deg F.
3. BwCB Figure 12, Rev. 2, Boron Dilution Rate Nomograph.
4. BwAR 1-9-B6, Rev. 5E3 "PW FLOW DEVIATION".

MATERIALS:

Calculator, and copies of reference procedures.

TASK STANDARDS:

1. Determine the amount and flow rate of PW necessary to lower boron concentration by 50 ppm over 1.0 hrs.
2. Initiate and secure a boron dilution of the RCS.
3. Respond to a PW Flow Deviation alarm.
4. Demonstrates the use of good Core Work Practices (CWP).

TASK CONDITIONS:

1. You are the Unit 1 NSO. Unit 1 is in Mode 3 at 557 deg F with all plant systems and controls normal.
2. Recently calculated ECC =CB D @ 100 steps and Boron = 1465 ppm.
3. Recent Boron sample = 1515 ppm.
4. Cold Xenon Free boron = 1300 ppm; SDM Calculated for Xenon free = 1000 ppm.

INITIATING CUES:

1. US has directed you to dilute the RCS 50 ppm to the critical boron concentration over the next 1.0 hrs, using the normal automatic dilution flowpath.

PERFORMANCE CHECKLIST	STANDARDS	SAT	UNSAT	N/A

RECORD START TIME ________

Note: Peer Checks may be asked for by the examinee, when this occurs, acknowledge the fact that a peer check has been requested and as the "peer checker" agree with everything the examinee does (i.e. do not coach through peer checking).

PERFORMANCE CHECKLIST	STANDARDS	SAT	UNSAT	N/A
1. Refer to BwOP CV-5. **(CUE: After examinee locates procedure, provide a copy. All Prerequisites, have been met.)**	Locate and Open BwOP CV-5.	☐	☐	☐
*2. Determine the required number of gallons of Primary Water to add to accomplish a 50 ppm dilution from 1515 ppm to 1465 ppm RCS boron concentration. **(Note: Current RCS Boron was given as a Task Condition.)**	DETERMINE the required amount of PW to accomplish a 50 ppm dilution of the RCS as follows: o Determine current RCS boron concentration to be 1515 ppm. • Using BwCB-1/2 Table 3-1 for 557 deg F, determine total number of gallons of PW to be added to be 2295-2326.	☐	☐	☐
*3. Determine the desired PW Flowrate to be 38.25-38.8 gpm.	DETERMINE the desired Primary Water Flowrate as follows: • Divide the total number of gallons determined in the previous step by 60 minutes. (38.25-38.8 gpm.)	☐	☐	☐
*4. Adjust the Setpoint on 1FK-111, PW/Total Flow Control Pot to be 2.39-2.43. **(Note: 16 gallons to the turn.)**	ADJUST the setpoint on 1FK-111, PW/Total Flow Control Pot to the desired flowrate: • Divide the gpm flowrate by 16 to determine the setpoint on the pot. • Adjust the setpoint to 2.39-2.43.	☐	☐	☐

PERFORMANCE CHECKLIST	STANDARDS	SAT	UNSAT	N/A
*5. Set the Primary Water Predet counter for the total number of gallons to be added.	Set the PW Predet counter, 1FY-0111, for the total number of gallons to be added as follows: • HOLD the RESET pushbutton in the DEPRESSED position while OPENING the window. • RELEASE the RESET pushbutton. • SET the thumbwheels to between 2295 and 2326. • HOLD the RESET pushbutton in the DEPRESSED position while CLOSING the window. • RELEASE the RESET pushbutton.	☐	☐	☐
*6. Align the Makeup Control System Switches.	Align the Makeup Control Switches as follows: • PLACE the MAKE-UP CONT Switch to STOP. • PLACE the Make-up MODE SELECT switch in the DIL position.	☐	☐	☐
*7. Start the dilution of the RCS. **(Note: The examinee may choose to divert letdown flow manually to the HUT and inform the RWO of his intent to divert flow and to monitor HUT levels. If so, provide acknowledgements.)**	Start the Dilution as follows: • PLACE the MAKE-UP CONT Switch to the START position. o VERIFY 1CV111B OPENS. o VERIFY 1CV111A MODULATES OPEN. o VERIFY 0PW02PA/B is in OPERATION. o VERIFY proper PW/Total Flow on 1FR-110, Rx Make-up Flow recorder.	☐	☐	☐

Note: After the examinee has completed JPM step 7, cue the simulator operator to close 1CV111A per the instructions in the setup comments.

PERFORMANCE CHECKLIST	STANDARDS	SAT	UNSAT	N/A
*8. Respond to PW Flow Deviation Alarm. Note: If operator reports that he can not continue because he can't ... **(CUE: As local operator, report IA to 1CV111A is isolated. As US acknowledge the report, and after the examinee recommends unisolating IA, direct recommencing the dilution after restoring IA.)**	Locate and Open BwAR 1-9-B6 and perform the following: o 1CV110B CLOSES after 30 secs. o 1CV111B CLOSES after 30 secs. o VERIFY/START PW Make-up pump. • DETERMINE reason for deviation to be closure of 1CV111A. • DISPATCH operator to check condition of 1CV111A. • Report findings to US.	☐	☐	☐
*9. Restore dilution line-up and restart the dilution of the RCS. **(CUE: Cue the simulator operator to fix the air problem, then report as local operator that IA has been restored to 1CV111A.)**	RESTORE Dilution line-up as follows: • Direct local operator to restore IA. • VERIFY/PLACE the MAKE-UP CONT Switch to the START position. o VERIFY 1CV111B OPENS. o VERIFY 1CV111A MODULATES OPEN. o VERIFY 0PW02PA/B is in OPERATION. o VERIFY proper PW/Total Flow on 1FR-110, Rx Make-up Flow recorder.	☐	☐	☐

Note: After ~80-100 gallons of PW has been added, CUE the examinee, that the startup is being delayed several hours and the ECC will be changing. The US directs you to stop the dilution and restore auto make-up capability per step 14 of BwOP CV-5.

PERFORMANCE CHECKLIST	STANDARDS	SAT	UNSAT	N/A
*10. Stop the dilution of the RCS.	Stop the Dilution as follows: • PLACE the MAKE-UP CONT Switch to the STOP position. o VERIFY 1CV111A CLOSES. o VERIFY 1CV111B CLOSES. o VERIFY 1CV110B CLOSES. o VERIFY 0PW02PA/B STOPS if started during the performance of this procedure.	☐	☐	☐

Steps 10 & 11 are unnecessary for this task/JPM

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PERFORMANCE CHECKLIST	STANDARDS	SAT	UNSAT	N/A
11. Align RMCS for Automatic Make-up. **(Note: The previous addition of ~100 gals of PW would cause a dilution of ~2 ppm. 1FK-110 should not have been adjusted from the original position to do the dilution. 1513 ppm corresponds to a setpoint of 6.5 turns. > 6.3 is acceptable.)** **(CUE: After [redacted] flow is ~~established,~~ restored conclude the JPM.)**	Align RMCS for Auto control as follows: • DETERMINE existing RCS Boron concentration. • DETERMINE the desired Boric Acid flowrate from BwCB-1/2 Figure 16 or Table 3-1. • Set 1FK-110 to the value corresponding to the desired flow rate. • VERIFY 1FK-110 is in AUTO. • PLACE the MODE SELECT switch in AUTO. • PLACE the MAKE-UP CONT switch in START.	☐	☐	☐

move back to step 9.

(CUE:) THIS COMPLETES THIS JPM.

RECORD STOP TIME ______________

COMMENTS:

N-26 (6/26/01)
ZD73EXAM

JOB PERFORMANCE MEASURE

TASK TITLE: **Establish Automatic Pzr Level Control with Failed 1CV121**

JPM No.: **N-77** REV: 6

TPO No.: IV.C.GP-06 K&A No.: (011A4.04)

TASK No.: GP-053 K&A IMP: 3.2/2.9

TRAINEE: ______________________________

EVALUATOR: ______________________________ DATE: ______________

The Trainee: PASSED __________ this JPM. TIME STARTED: ____________________

FAILED __________ TIME FINISHED: ____________________

CRITICAL ELEMENTS: **(*) 2,4** JPM TIME: __________ MINUTES

CRITICAL TIME: **NA** APPROX COMPLETION TIME **8** MINUTES

EVALUATION METHOD:
X PERFORM
_____ SIMULATE

LOCATION:
_____ IN PLANT
X SIMULATOR

GENERAL REFERENCES:

1. 1BwGP 100-1, Rev. 15, Plant Heatup.

MATERIALS:

Copy of Step 62 of 1BwGP 100-1.

TASK STANDARDS:

1. Recognize and respond to a failure of the 1CV121 Controller while attempting to establish automatic Pzr Level control.
2. Demonstrates the use of good Core Work Practices (CWP).

TASK CONDITIONS:

1. You are the Unit 1 NSO.
2. The Unit is at 100% power.
3. An hour ago, Pzr Level Channel 1LT-459 was restored from test.
4. Actual Level and Demanded Level have been matched for 16 minutes.

INITIATING CUES:

1. The US has directed you restore automatic pressurizer level control per the applicable portions of step 62 of 1BwGP 100-1.

PERFORMANCE CHECKLIST	STANDARDS	SAT	UNSAT	N/A
RECORD START TIME __________				
1. Refer to 1BwGP 100-1 step 62. **(CUE: After examinee locates procedure, provide a copy. All Prerequisites have been met.)**	Locate and Open 1BwGP 100-1 to step 62.	☐	☐	☐
*2. Place Pressurizer Level control in Automatic.	Perform the following to establish automatic pressurizer level control: ○ VERIFY/PLACE 1CV121 in MANUAL to match PZR actual level to demanded level. ○ MAINTAIN PZR actual and demanded level equal for 10-15 minutes. ○ VERIFY/PLACE 1LK-459, Master Pzr Level Controller in MANUAL. • PLACE 1FK-121 (1CV121), in AUTO.	☐	☐	☐
3. Identify 1FK-121 (1CV121) failure.	Identify 1CV121 demand signal increasing to 100% and 1CV121 throttling to full open.	☐	☐	☐
*4. Mitigate the pressurizer level transient caused by an increase in charging flow.	Perform the following to mitigate the failure of 1CV121: • PLACE 1FK-121 (1CV121) in MANUAL. • REDUCE demanded signal to throttle charging flow to maintain a stable pressurizer level at program value.	☐	☐	☐

PERFORMANCE CHECKLIST	STANDARDS	SAT	UNSAT	N/A
5. Inform US of 1CV121 controller failure.	Inform US of 1CV121 failure.	☐	☐	☐

(CUE: As US, acknowledge failure of 1CV121 and that you will inform maintenance.)

(CUE:) THIS COMPLETES THIS JPM.

RECORD STOP TIME ______________________

COMMENTS:

JOB PERFORMANCE MEASURE

TASK TITLE: **Decrease SI Accumulator Pressure**

JPM No.: **N-04** REV: 8

TPO No.: IV.C.SI-04 K&A No.:(006A4.02)

TASK No.: SI-003 K&A IMP: 4.0/3.8

TRAINEE: ______________________

EVALUATOR: ______________________ DATE: ____________

The Trainee: PASSED ________ this JPM. TIME STARTED: ____________

FAILED ________ TIME FINISHED: ____________

CRITICAL ELEMENTS: **(*) 3, 5** JPM TIME: ________ MINUTES

CRITICAL TIME: **NA** APPROX COMPLETION TIME ~~8~~ 12 MINUTES

EVALUATION METHOD:

X PERFORM
_____ SIMULATE

LOCATION:

_____ IN PLANT
X SIMULATOR

GENERAL REFERENCES:

1. Bwar 1-5-B2, Rev. 6E3, ACCUM PRESS 1B HIGH LOW
2. BwOP SI-9, Rev. 8E7, Lowering SI Accumulator Pressure
3. ITS 3.5.1

MATERIALS:

None

TASK STANDARDS:

1. Return accumulator pressure to within the Tech Spec limits.
2. Demonstrates the use of good Core Work Practices (CWP).

TASK CONDITIONS:

1. You are the Unit 1 Admin NSO.
~~2. Both units are at 100% power.~~
~~3. All Controls are in Automatic.~~
2. No personnel are currently inside U1 Cnmt.

INITIATING CUES:

1. Annunciator 1-5-B2, "ACCUM 1B PRESS HIGH LOW", has just annunciated. The Unit Supervisor has directed to ~~investigate and~~ correct the alarm condition. An Operator has been dispatched to check the nitrogen line-up per BwOP NT-9.
2. The cause for the ~~high~~ Abnormal pressure condition has been ~~detected~~ indentified and corrected.

PERFORMANCE CHECKLIST	STANDARDS	SAT	UNSAT	N/A
RECORD START TIME ________				
1. Refer to BwAR 1-5-B2.	Locate and Open BwAR for 1-5-B2.	☐	☐	☐
2. Determine 1B SI Accumulator Pressure is High.	Determine 1B SI Accumulator Pressure is High: • Monitor 1PI-962 and 963 (1B Pressure). • Monitor 1LI-952 and 953 (1B Level). o Check SER points 0602 and 2067 in alarm.	☐	☐	☐
*3. Enter LCOAR 1BwOL 3.5.1. **(CUE: US enters LCOAR 1BwOL 3.5.1 and directs you to lower pressure to 625 psig.)**	Inform the US to enter LCOAR 1BwOL 3.5.1 due to High pressure in the 1B SI Accumulator.	☐	☐	☐
4. Refer to BwOP SI-9 "Lowering SI Accumulator Pressure." **(Note: After examinee locates correct procedure, provide a copy. Since there are no "Personnel in Containment" signs posted, there is no one in containment. Precautions listed under BwOP SI-9, D.2 are not applicable. Performing step F.2 is unacceptable due to RCS pressure > 1000 psig which requires all accumulators operable. If examinee opens more than one 1SI8875 valve at the same time, conclude the JPM, and mark as FAILED.)**	Locate and Open BwOP SI-9. After reviewing the Prerequisites, Precautions, and Limitations and Actions, determine step F.1 applies.	☐	☐	☐

PERFORMANCE CHECKLIST		STANDARDS	SAT	UNSAT	N/A
*5. Lower 1B SI Accumulator Pressure.	**(CUE: If asked as local operator about the status of the nitrogen line-up, report the line-up is correct. If the examinee suspects check valve back leakage and reports this to the US, acknowledge it.)**	Perform the following to lower 1B SI Accumulator Pressure to 625 psig. o Verify/Close 1AOV-SI8880, N2 Supply Isol Vlv. o Verify/Close 1SIHCV943, Vent cont Vlv. • Open 1AOV-SI8875B, SI Accumulator 1B Vent Vlv. • Throttle Open 1SIHCV943, Vent Cont Vlv. o Monitor SI Accumulator 1B pressure indicators. • Close 1AOV-SI8875B, SI Accumulator 1B Vent Vlv when pressure 620-630 psig. o Close 1SIHCV943, Vent Control Valve.	☐	☐	☐
6. Exit LCOAR 1BwOL 3.5.1.	**(CUE: US acknowledges pressure restored and exits LCOAR.**	Inform US that pressure is within the Tech Spec limit, the alarm cleared, and the LCOAR (1BwOL 3.5.1) may be exited.	☐	☐	☐

(CUE:) THIS COMPLETES THIS JPM.

RECORD STOP TIME ______________________

COMMENTS:

N-04 (6/26/01)
ZD73EXAM

JOB PERFORMANCE MEASURE

TASK TITLE: **Perform start of 1A CS Pump for Surveillance Test**

JPM No.: **N-123a** REV: 2

TPO No.: IV.C.CS-01 K&A No.: (026A4.01)

TASK No.: CS-010 K&A IMP: 4.5/4.3

TRAINEE: ____________________

EVALUATOR: ____________________ DATE: __________

The Trainee: PASSED ________ this JPM. TIME STARTED: ____________

FAILED ________ TIME FINISHED: ____________

CRITICAL ELEMENTS: **(*) 2, 3, 5, 6** JPM TIME: ________ MINUTES

CRITICAL TIME: **NA** APPROX COMPLETION TIME ~~10~~ 13 MINUTES

EVALUATION METHOD: LOCATION:

X PERFORM ____ IN PLANT

____ SIMULATE X SIMULATOR

GENERAL REFERENCES:

1. 1BwVSR 5.5.8.CS.1 Rev. 3, ASME surveillance Requirements for 1A Containment Spray Pump and Check Valves 1CS003A, 1CS011A
2. BwOP CS-5, Rev. 11, Containment Spray system Recirculation to the RWST

MATERIALS:

Partially completed copy of 1BwVSR 5.5.8.CS.1 (completed through step F.1.4.)

TASK STANDARDS:

1. Perform start of 1A CS pump.
2. Demonstrates the use of good Core Work Practices (CWP).

TASK CONDITIONS:

1. You are the Unit 1 Admin NSO.
2. The Unit is at 100% power.
3. Unit 2 is at 100% power.
4. Local operator standing by at 1A CS pump to assist in any in-plant operations.

INITIATING CUES:

1. The US has directed you to start 1A CS pump in accordance with BwOP CS-5 to support 1BwVSR 5.5.8.CS.1 step F.1.5. (1A CS pump ASME surveillance)
2. Engineering is Standing by with Stop watch

PERFORMANCE CHECKLIST	STANDARDS	SAT	UNSAT	N/A

Note: Provide a copy of surveillance 1BwVSR 5.5.8.CS.1 completed through step F.1.4 to the examinee.

RECORD START TIME __________

PERFORMANCE CHECKLIST	STANDARDS	SAT	UNSAT	N/A
1. Refer to 1BwVSR 5.5.8.CS.1.	Refer to 1BwVSR 5.5.8.CS.1, and Locate and Open BwOP CS-5.	☐	☐	☐
(CUE: All Prerequisites have been met. If asked as local operator, 1A CS pump is ready for a start.)	after locating BwOP CS-5 provide copy.			
*2. Verify valve alignment per BwOP CS-5.	Enter LCOARs 1BwOL 3.6.6 and 3.6.7.	☐	☐	☐
(CUE: As US acknowledge entry into LCOARs 1BwOL 3.6.6 and 3.6.7)	VERIFY/CLOSE: o 1MOV CS009A VERIFY/OPEN: o 1MOV CS001A VERIFY/CLOSE: o 1MOV CS019A o 1MOV CS007A			
(CUE: As local operator, unlock and close 1CS040A; and Unlock and open 1SI001A.)	Direct local operator to: UNLOCK and CLOSE: • 1CS040A UNLOCK and OPEN: • 1SI001A			
*3. Prepare to start 1A CS pump on recirc to the RWST.	Place 1A CS pump TEST Switch in the TEST position.	☐	☐	☐
cue Eng. has Stopwatch				
4. Attempt start 1A CS pump.	Take the control switch for 1A CS pump to START.	☐	☐	☐

PERFORMANCE CHECKLIST		STANDARDS	SAT	UNSAT	N/A
*5. Identify failure of 1A CS pump to start.		• Identify 1A CS pump failure to start and inform US.	☐	☐	☐
(CUE:	**As US acknowledge the pump failure and cue simulator operator to release override of control switch.** **Then, as US, cue examinee to evaluate the failure as to whether it should count as a start with respect to starting duties.** **After this evaluation, as US, direct the examinee to make another attempt.)**	o Failure does NOT count as start for starting duty purposes. (No current flow, no trip light).			
*6. Start 1A CS pump on recirc.		START 1A CS pump by performing the following: • Start switch to start, then normal after start.	☐	☐	☐
(Cue:	**As US acknowledge report.)**	o Report successful start to US.			

(CUE:) THIS COMPLETES THIS JPM.

RECORD STOP TIME ____________________

COMMENTS:

JOB PERFORMANCE MEASURE

TASK TITLE: **Operate a Rad Monitor (Disable Incore Seal Table Monitor Audible Alarm)**

JPM No.: **N-69C** REV: 1

TPO No.: IV.C.AR-03 K&A No.: (073A4.02)

TASK No.: AR-001 K&A IMP: 3.7/3.7

TRAINEE: ____________________

EVALUATOR: ____________________ DATE: __________

The Trainee: PASSED ________ this JPM. TIME STARTED: __________

FAILED ________ TIME FINISHED: __________

CRITICAL ELEMENTS: **(*) 2, 3** JPM TIME: ________ MINUTES

CRITICAL TIME: **NA** APPROX COMPLETION TIME **8** MINUTES

EVALUATION METHOD:
X PERFORM
_____ SIMULATE

LOCATION:
_____ IN PLANT
X SIMULATOR

GENERAL REFERENCES:

1. BwOP IC-9, Rev. 0, Movable Incore Detector Operation.

MATERIALS:

Copy of BwOP IC-9.

TASK STANDARDS:

1. Disable the audible alarm of the Incore Seal Table Radiation Monitor.
2. Demonstrates the use of good Core Work Practices (CWP).

TASK CONDITIONS:

1. You are an extra NSO.
2. Both units are at power with all systems normal.
3. ~~QED~~ System Engineer is performing 1BwVS TRM 3.3.a.1, and needs the Incore Seal Table Rad Monitor audible alarm disabled.

INITIATING CUES:

1. The US has directed you to disable the audible alarm of the Incore Seal Table Rad Monitor for Unit 1 per step 1 of BwOP IC-9, Movable Incore Detector Operation.

PERFORMANCE CHECKLIST	STANDARDS	SAT	UNSAT	N/A

RECORD START TIME __________

1. Refer to BwOP IC-9 or BwVS TRM 3.3.a.1. **(CUE: After examinee locates correct procedure, provide a copy. All Prerequisites have been met.)**	Locate and open the following: • BwOP IC-9, Step 1.	☐	☐	☐

Note: Provide cues only if JPM NOT performed in the simulator.

*2. Select 1AR014JJ skid on RM-11. **(CUE: RM-11 is in Supervisor mode.** **Grid 4 is on screen.** **Channel 4303 is entered.** **1AR014J has white cursor surrounding it.)**	Select 1AR014J skid at the RM-11 keyboard as follows: • PLACE the RM-11 in Supervisor mode by depressing the Supervisor/Normal button and verifying the Supervisor half backlights. • DEPRESS grid 4 pushbutton. • DEPRESS, in order, 4, 3, 0, 3. • DEPRESS SEL.	☐	☐	☐

PERFORMANCE CHECKLIST		STANDARDS	SAT	UNSAT	N/A
*3.	Disable the audible alarm for the Incore Seal Table Rad Monitor.	Disable the audible alarm for the Incore Seal Table Rad Monitor as follows:	☐	☐	☐
(CUE:	**Channel Item button pushed.**	• With channel 4303 selected, push the CHANNEL ITEM button.			
	16 inserted, Select button pushed.	• On the keypad, insert 16 and push the SELECT button.			
	As US and Unit NSO acknowledge notification of expected RM-11 alarm.	o Notify US and Unit NSO of expected alarm on the RM-11 due to next step.			
	0 inserted, Enter button pushed.	• On the keypad insert 0 and push the ENTER button.			
(Note:	**If the examinee asks why the RM-11 did not provide an audible alarm, inform the examinee that the alarm has been disabled in order to conduct JPMs without distracting other examinees.)**				
	RM-11 in Normal mode.	• PLACE the RM-11 in the Normal mode.			
	As US/NSO acknowledge report of audible alarm disabled.	• Inform US/NSO audible Alarm for Incore Seal Table Rad Monitor is disabled.			

(CUE:) THIS COMPLETES THIS JPM.

RECORD STOP TIME ____________________

COMMENTS:

JOB PERFORMANCE MEASURE

TASK TITLE: **Use Containment Mini-purge to Reduce Containment Pressure.**

JPM No.: **N-161** REV: 0

TPO No.: III.C.VP-09-A K&A No.: (029A1.03)

TASK No.: VQ-006 K&A IMP: 3.0 / 3.3

TRAINEE: ____________________

EVALUATOR: ____________________ DATE: __________

The Trainee: PASSED ________ this JPM. TIME STARTED: ____________

FAILED ________ TIME FINISHED: ____________

CRITICAL ELEMENTS: **(*) 3, 4** JPM TIME: ________ MINUTES

CRITICAL TIME: **N/A** APPROX COMPLETION TIME ~~15~~ 30 MINUTES

EVALUATION METHOD: LOCATION:

X PERFORM ___ IN PLANT

___ SIMULATE X SIMULATOR

GENERAL REFERENCES:

1. BwOP VQ-6, Containment Mini-purge system Operation, Rev. 12.

MATERIALS: Copy of BwOP VQ-6.

TASK STANDARDS:

1. Reduce containment pressure to < 0.3 psig, without exceeding the Tech Spec limit of -0.1 psig, by utilizing the mini-purge system.
2. Demonstrates the use of good Core Work Practices.

TASK CONDITIONS:

1. You are the Unit 1 Admin NSO.
2. All plant systems and controls are normal for the current plant conditions.

INITIATING CUES:

1. Containment pressure is +0.5 psig, and Hydrogen concentration is increasing.
2. It is desired to reduce containment pressure to < +0.3 psig, and then sample for hydrogen in preparation for a containment entry next shift.
3. The US has directed you to use the Containment Mini-purge system to reduce containment pressure to NOT LESS THAN -0.1 psig per BwOP VQ-6 utilizing mini purge fan.
4. Radiation Protection has been notified and is aware of the purpose of the venting. BwRP 6110-13T1 has been approved by the Shift Manager.

NOTE: Hand partially competed (through D.2.b) copy of BwRP 6110-13T1 to examinee.

PERFORMANCE CHECKLIST	STANDARDS	SAT	UNSAT	N/A

RECORD START TIME ________

1. Refer to BwOP VQ-6, "Containment Mini-purge System Operation." **(CUE: If asked as US, confirm that the system E and M line-ups are appropriately aligned, RP will not be changing 1PR01J filters, the cavity is not flooded up, and the requirements of spec 3.6.3 are met.)**	Locate and Open BwOP VQ-6 and perform the following: • Review Prerequisites • Review Precautions • Review Limitations and Actions • Determine steps 1-3, 8 and 9 are applicable to this evolution.	☐	☐	☐
2. Verify the requirements of BwRP 6110-13T1 are met." **(CUE: Initiating Cues provided SM approved BwRP 6110-13T1. If called to check fume hood fan, report it is running. The exh fan may be checked on the MCB.)**	Verify the requirements of BwRP 6110-13T1 are met: • SM has approved BwRP 6110-13T1. • Either 0VA02CA/B (VA Exh Fan)A/B Trn 0A) or 0VL02CA/B (Fume Hood Exh Fan 0A/B) is in operation.	☐	☐	☐

Note: once identified entry into VQ-6 and procedure found, hand candidate a copy and cue him that all prereq precautions and limitation and actions have been met

PERFORMANCE CHECKLIST	STANDARDS	SAT	UNSAT	N/A
*3. Perform damper alignment. **(CUE: If asked to verify these valves locally, the ones outside containment are all OPEN.** **If asked for a local check of the fan, report they are ready to start, and after starting report conditions normal.** **As SM, acknowledge the commencement of the release.** **If asked for a purge flow rate report 3700 cfm.)** As US, when asked purge Cmnt with mini purge Fan	Perform the following to align the dampers and start the venting of containment: • OPEN 1AOV-VQ005A, Mini-Flow Prg Exh Inside Isol Vlv. • OPEN 1AOV-VQ005B, Mini-Flow Prg Exh Outside Isol Vlv. • OPEN 1AOV-VQ05C, Mini-Flow Prg Exh Outside Isol Vlv. • RECORD time valves were opened on BwRP 6110-13T1. (D.2.d) • START 1VQ05C, Cnmt Mini-Flow Prg Exh Fan. • RECORD start time of fan on BwRP 6110-13T1. (D.2.e) o Record purge flowrate on BwRP 6110-13T1. (D.2.f) o Monitor Containment pressure.	☐	☐	☐
*4. Stop the Containment venting after pressure is < +0.3 psig, but before it is < -0.1 psig.	Secure the Mini-Flow Purge Exhaust Fan as follows: • STOP 1VQ05C, Cnmt Min-Flow Prg Exh Fan. • RECORD fan stop time on BwRP 6110-13T1. (D.2.g) • CLOSE 1AOV-VQ005A, min-Flow Prg Exh Inside Isol vlv. • CLOSE 1AOV-VQ005B, min-Flow Prg Exh Outside Isol Vlv. • CLOSE 1AOV-VQ005C, Min-Flow Prg Exh Outside Isol Vlv. • RECORD valve closure time on BwRP 6110-13T1. (D.2.h) o RECORD Containment final pressure on BwRP 6110-13T1.	☐	☐	☐

PERFORMANCE CHECKLIST	STANDARDS	SAT	UNSAT	N/A
5. Report Containment venting complete and ready to re-sample for Hydrogen to SM. **(CUE: Acknowledge reports.)**	Report the following to the SM: • Containment Vent complete. • Ready to sample again for hydrogen.	☐	☐	☐

(CUE:) THIS COMPLETES THIS JPM.

RECORD STOP TIME ___________

COMMENTS:

JOB PERFORMANCE MEASURE

TASK TITLE: **Respond to increasing level in the RCDT.**

JPM No.: **N-162** REV: 0

TPO No.: III.C.RY-11 K&A No.: (068A2.04)

TASK No.: RY-008 K&A IMP: 3.3 / 3.3

TRAINEE: ______________________________

EVALUATOR: ____________________________ DATE: ______________

The Trainee: PASSED __________ this JPM. TIME STARTED: __________________

FAILED __________ TIME FINISHED: __________________

CRITICAL ELEMENTS: (*) X 3,4 JPM TIME: __________ MINUTES

CRITICAL TIME: **N/A** APPROX COMPLETION TIME **6** MINUTES

EVALUATION METHOD:
X PERFORM
_____ SIMULATE

LOCATION:
_____ IN PLANT
X SIMULATOR

GENERAL REFERENCES:

1. BwAR 0RE01J-1-A1, Rev. 6, REACTOR COOLANT DRAIN TANK LEVEL UNIT 1 HIGH LOW
2. BwAR 1-9-E5, Rev. 5E1, BA/GW/RE LOCAL PANEL TROUBLE
3. BwOP RE-1, Rev 9. REACTOR COOLANT DRAIN TANK PUMP OPERATION

MATERIALS: Copy of BwAR 0RE01J-1-A1, BwAR 1-9-E5, ~~and~~ 1BwOA RCP-1, BwOP RE-1

TASK STANDARDS:

1. Return Unit 1 RCDT level to within limits.
2. Demonstrates the use of good Core Work Practices.

TASK CONDITIONS:

1. You are the Unit 1 Admin NSO.
2. All plant systems and controls are normal for the current plant conditions.

INITIATING CUES:

1. Annunciator 1-9-E5 has been lit for 10 minutes. Report from the Rad Waste Panel Operator indicates a high level in the U-1 RCDT.
2. 1BwOA RCP-1 has been entered for a seal problem on 1B RCP. The applicable steps from 1-14 have been completed.
3. The US has directed you to align both RCDT pumps for automatic operation in accordance with BwOP RE-1 to lower RCDT level to normal at a maximum rate.

PERFORMANCE CHECKLIST	STANDARD	SAT	UNSAT	N/A
RECORD START TIME __________				
1. Refer to BwOP RE-1.	Locate and Open BwOP RE-1.	☐	☐	☐
(CUE: If asked, the Prerequisites are all met.)				
(CUE: If asked as RWO, confirm level in U-1 RCDT is 92% and slowing increasing.)				
after locating BwOP RE-1 provide copy				

N-162 (6/22/01)
ZD73EXAM

PERFORMANCE CHECKLIST		STANDARD	SAT	UNSAT	N/A
X2. Align RCDT pumps for Automatic Operation.		Perform the following to align 1A and 1B RCDT pumps for automatic operation:	☐	☐	☐
(CUE:	**Local operator reports local control switch for 1RE-9170 is in auto.**	• Dispatch operator to PLACE 1AOV-RE9170, Local Control Switch in AUTO. • Verify OPEN 1AOV-RE9170, RCDT PP at 1PM011J.			
* 3.	**Local operator reports local control switch for 1RE1003 is in AUTO.**	• Dispatch operator to PLACE 1AOV-RE1003 local control switch in AUTO. • OPEN 1AOV-RE1003, at 1PM011J.			
* 4. use Switch EPN # in Procedure	**Local operator reports the transfer switches for 1A and 1B RCDT pumps are in remote at 0RE01J.** **Local operator reports the local control switches for 1A and 1B RCDT pumps are in AUTO at 0RE01J.** REO1PA/B A/B RCDT pump	• Dispatch operator to PLACE 1A and 1B RCDT pump transfer switches in REMOTE at 0RE01J. • Dispatch operator to PLACE 1A and 1B RCDT pump local control switches in AUTO at 0RE01J. • PLACE 1A and 1B RCDT pump control switches in AUTO at 1PM05J.			
5.	**As RWO acknowledge RCDT being pumped down and level is decreasing.** **As US acknowledge RCDT being pumped down.)**	• VERIFY both RCDT pumps start at 1PM05J. • Contact RWO to verify RCDT level decreasing.			

(CUE:) THIS COMPLETES THIS JPM.

RECORD STOP TIME ___________

COMMENTS:

JOB PERFORMANCE MEASURE

TASK TITLE: **Local Operation of a S/G PORV**

JPM No.: **N-83** REV: 8

TPO No.: IV.C.MS-06 K&A No.: (041A4.06)

TASK No.: MS-002 K&A IMP: 2.9/3.1

TRAINEE: ____________________________

EVALUATOR: __________________________ DATE: ______________

The Trainee: PASSED __________ this JPM. TIME STARTED: ___________________

FAILED __________ TIME FINISHED: ___________________

CRITICAL ELEMENTS: **(*) 2, 4-7** JPM TIME: __________ MINUTES

CRITICAL TIME: **NA** APPROX COMPLETION TIME **14** MINUTES

EVALUATION METHOD:
_____ PERFORM
__X__ SIMULATE

LOCATION:
__X__ IN PLANT
_____ SIMULATOR

GENERAL REFERENCES:

1. BwOP MS-6, Rev. ~~7~~ 8, Local Operation of the Steam Generator Power Operated Relief Valves.

MATERIALS: Key

1. FP Key to unlock Hand Pump Extender Tool Box, and sound powered phones.
2. Copy of BwOP MS-6.
3. Turn out gear per BwOP MS-6 (Ice vest, steam suit, or FP turnout gear).

TASK STANDARDS: Where.

1. Correctly open 2A S/G PORV (2MS018A).
2. Demonstrates the use of good Core Work Practices (CWP).

TASK CONDITIONS:

1. You are an equipment operator.
2. The Unit NSO is unable to operate the 2A S/G PORV (2MS018A) from the control room or remote S/G Panels

INITIATING CUES:

1. You have been directed to open 2A S/G PORV (2MS018A) 25% locally per BwOP MS-6. An equipment operator is standing by at MCC 231X2B.
2. It is expected to be very hot, with the potential for escaping steam at the Porv.

Security nec? Bat door NO! will open door from inside.

N-83 (6/26/01)
ZD73EXAM

PERFORMANCE CHECKLIST	STANDARDS	SAT	UNSAT	N/A

RECORD START TIME ________

Note: Proper safety precautions must be adhered to. The examinee must be able to locate the turnout gear, but does not have to don it (at the examiner's discretion.) It is also necessary to wear the proper hearing protection when locally operating the S/G Porvs. Failure of the examinee to recognize PPE requirements shall result in JPM failure. An exit route should be pre-planned.

PERFORMANCE CHECKLIST	STANDARDS	SAT	UNSAT	N/A
1. Refer to BwOP MS-6 and gather necessary materials and make preparations. (CUE: **After examinee locates procedure, provide a copy. After examinee locates turnout gear and sound powered phone with cord, provide a cue that there is a phone at the local site.)**	Locate and OPEN BwOP MS-6 and locate the following equipment: • ~~FP~~ Z Key for hand pump extender tool box. ○ FP Turnout Gear. • Sound powered phone and cord. • Hearing Protection. ~~○ Exit route plan~~.	☐	☐	☐
*2. De-energize the hydraulic pump for the 2A S/G PORV, 2MS018A. (CUE: **SM directs step 2.a. be performed. The EA reports that he has opened the breaker.)**	De-energize the hydraulic pump for 2MS018A as follows: • Contact the EA at MCC231X2B and have him OPEN the breaker at compartment B1-A.	☐	☐	☐
3. Establish communications with the control room. (CUE: **Communications have been established.)**	Establish communications with the control room.	☐	☐	☐
*4. Align valves for local operation. (Note: **These valves are on top of the PORV.)** (CUE: **2MS185A is OPEN. 2MS186A is OPEN. 2MS187A is OPEN.)**	Align valves for local operation by OPENING: • 2MS185A • 2MS186A • 2MS187A	☐	☐	☐

PERFORMANCE CHECKLIST	STANDARDS	SAT	UNSAT	N/A
*5. Equalize pressure. (Note: **The gages are located above the hand pump.)** (CUE: **Setscrews are loosened.)** **Pressures are equalized on all 3 gages.** **Setscrews are tightened.)**	Perform the following at the handpump: • Loosen the two setscrews on the hand pump. • When pressure is equalized, tighten setscrews.	☐	☐	☐
*6. Position valve handle to OPEN position. (CUE: **Handle is in open position.)**	Turn 3 position valve handle from the NEUTRAL position to the OPEN position.	☐	☐	☐

Note: The next step will simulate opening the PORV. The PPE requirements apply.

*7. Operate the hand pump to open 2MS018A to 25% open position. (CUE: **2MS018A is open to the 25% open position. Another EA will take over now.)**	Operate the hand pump to OPEN 2MS018A to the 25 % OPEN position as directed by the control room.	☐	☐	☐

(CUE:) THIS COMPLETES THIS JPM.

RECORD STOP TIME ________________________

COMMENTS:

JOB PERFORMANCE MEASURE

TASK TITLE: **Determine the Status of a DC Bus**

JPM No.: **N-31** REV: 5

TPO No.: IV.D.OA-23 K&A No.: (058AA1.03)

TASK No.: OA-007 K&A IMP: 3.1/3.3

TRAINEE: ______________________________

EVALUATOR: ____________________________ DATE: ______________

The Trainee: PASSED __________ this JPM. TIME STARTED: __________________

FAILED __________ TIME FINISHED: __________________

CRITICAL ELEMENTS: **(*) 5-7,9-11** JPM TIME: __________ MINUTES

CRITICAL TIME: **NA** APPROX COMPLETION TIME **20** MINUTES

EVALUATION METHOD:

_____ PERFORM

__X__ SIMULATE

LOCATION:

__X__ IN PLANT

_____ SIMULATOR

GENERAL REFERENCES:

1. 2BwOA ELEC-1, Rev. 55A, Loss of DC Bus Unit 2.

MATERIALS:

1. 2BwOA ELEC-1, Loss of DC Bus, Steps 15 and 16.
2. Multi-meter, Screwdriver, Fuse Puller, Low Voltage Gloves.
3. Pictures of the insides of the DC bus.

Tools

TASK STANDARDS:

1. De-energize DC Bus and Verify DC Bus voltage is zero.
2. Check DC Bus resistance.
3. Demonstrates the use of good Core Work Practices (CWP).

TASK CONDITIONS:

1. You are the the U-2 Equipment Operator.
2. 2BwOA ELEC-1, Loss of DC Bus is in progress and Step 14 has just been completed.
3. Unit 1 is at 100% power.

INITIATING CUES:

1. The SM has directed you to perform 2BwOA ELEC-1 for DC Bus 211 starting at step 15 to determine the status of DC Bus 211. EMD personnel are available to perform meggering.

please provide early parts of 2BwOA Elec-1 for Proc. Dir. Act.

There are none. No need to include rest of proc.

N-31-2 (6/26/01)
ZD73EXAM

PERFORMANCE CHECKLIST	STANDARDS	SAT	UNSAT	N/A

RECORD START TIME __________

Note: After the examinee has located the procedure, provide a copy. Prompt the use of a laser pointer to show the location of actions that would break the plane of any electrical cabinet or panel. LV gloves must be obtained by the examinee.

1. Refer to 2BwOA ELEC-1, Loss of DC Bus.	Locate and Open 2BwOA ELEC-1, Loss of DC Bus.	☐	☐	☐
2. Locally verify battery main feed breaker not opened inadvertently. **(CUE: Bkr is tripped open, no one is in the area. Bkr appears damaged.)**	CHECK 125 VDC Feed from Battery 211 (Cub AF2) not opened inadvertently.	☐	☐	☐
3. Obtain equipment.	Obtain equipment: • Multi-meter • Fuse Puller • Screwdriver • Low Voltage gloves (prior to cabinet entry).	☐	☐	☐
4. Verify DC Bus feed breakers open.	VERIFY the following breakers OPEN: • Bus Tie Breaker to 125V DC Bus 111 (Cub DF1). • 125V DC Feed from Battery 211 (Cub AF2).	☐	☐	☐
*5. Open all load breakers. **(CUE: After examinee simulates moving the switches to open, cue that they are open.)**	OPEN the following load breakers: • DC Bus 211 (BF1) • DC Bus 211 (BR1) • DC Bus 213 (EF1) • DC Bus 213 (ER1)	☐	☐	☐

Note: Pictures of the inside of the panels are available for use to avoid opening panels with exposed circuits for JPM steps 6 and 7.

PERFORMANCE CHECKLIST	STANDARDS	SAT	UNSAT	N/A
*6. Using the appropriate PPE, remove the MCB voltmeter fuses. **(CUE: As fuses are located, they are removed.**	Using LV gloves and the fuse puller REMOVE the MCB voltmeter fuses from cub CF1: • FU3 • FU4	☐	☐	☐
*7. Check DC Bus 211 voltage zero. **(CUE: Multi-meter selected to proper setting, indicates zero volts.**	CHECK DC Bus 211 Voltage zero: • Positive Lead on L1 (Cub CF1). • Negative Lead on L2 (Cub CF1).	☐	☐	☐
8. Inform EMD that bus can be meggered. **(CUE: EMD reports resistance between L1 and L2 is > 500k ohms; resistance between L1 and ground is > 250k ohms; and resistance between L2 and ground is > 250k ohms.)**	Request EMD to megger DC Bus 211 at the following points: • Resistance between L1 and L2. • Resistance between L1 and ground. • Resistance between L2 and ground.	☐	☐	☐

Note: Prior to reinstalling fuses, examinee may check them with the VOM. The VOM should be on Resistance (ohms), cue for good fuse is 0, bad fuse is infinite.

PERFORMANCE CHECKLIST	STANDARDS	SAT	UNSAT	N/A
*9. Using proper PPE, reinstall MCB voltmeter fuses for DC bus 211. **(CUE: Fuses are reinstalled.)**	Using LV gloves, reinstall MCB Voltmeter fuses (Cub CF1): • FU3 • FU4	☐	☐	☐
*10. Check power available to DC Bus 211.	Check power available to DC Bus 211 as follows: • Place voltmeter switch (Cub CF1) to BAT			
(CUE: Battery voltage is zero.	• Read battery voltage on BUS/CHGR VOLTMETER (2EI-DC009) > 110 volts.	☐	☐	☐
Battery Charger voltage is zero.	• Check Battery charger voltage (2EI-DC030) > 110 volts.	☐	☐	☐

PERFORMANCE CHECKLIST	STANDARDS	SAT	UNSAT	N/A
*11. Determine Bus 211 must be energized from Bus 111. **(CUE: As US acknowledge recommendation to cross tie bus 211 to 111. Another EO will perform the crosstie.)**	Determine bus 211 must be energized from bus 111 and report to US: • Bus megger SAT. • No power available from battery, or charger. • Recommend cross tie.	☐	☐	☐

(CUE:) THIS COMPLETES THIS JPM.

RECORD STOP TIME ____________________

COMMENTS:

JOB PERFORMANCE MEASURE

TASK TITLE: **Local Emergency Start of the 2B Aux FW Pump from 2AF03J**

JPM No.: **N-56A** REV: 1

TPO No.: IV.C.AF-02 K&A No.: ~~(068AA1.02)~~ 013A4.01

TASK No.: AF-002 K&A IMP: 4.~~3~~5/4.~~5~~8

TRAINEE: ____________________________

EVALUATOR: ____________________________ DATE: ______________

The Trainee: PASSED __________ this JPM. TIME STARTED: ________________

FAILED __________ TIME FINISHED: ________________

CRITICAL ELEMENTS: **(*)** **8** JPM TIME: __________ MINUTES

CRITICAL TIME: **NA** APPROX COMPLETION TIME **12** MINUTES

EVALUATION METHOD: ____ PERFORM, **X** SIMULATE

LOCATION: **X** IN PLANT, ____ SIMULATOR

2b

GENERAL REFERENCES:

1. BwOP AF-7, Rev. 16, Auxiliary Feedwater Pump B (Diesel) Startup on Recirc.
2. BwOP AF-7T1 Rev. 0E1, Diesel Driven Auxiliary Feedwater Pump Operating Log.

MATERIALS:

Copy of BwOP AF-7, and BwOP AF-7T1.

TASK STANDARDS:

1. Perform a local emergency start of 2B AFW pump.
2. Demonstrates the use of good Core Work Practices (CWP).

TASK CONDITIONS:

1. You are a Unit 2 Safe Shutdown Operator.
2. Unit 2 has just tripped in conjunction with an electrical fire in Unit 2 Remote Shutdown Panel.
3. 2A AFW pump is OOS for maintenance.
4. 2B AFW pump did not auto start, nor will it manually start with either the MCR switch or the Remote Shutdown Panel switch.

INITIATING CUES:

1. The US has directed you to perform a local emergency start of the 2B AFW pump using BwOP AF-7. All Prerequisites have been met, and steps 1-9 are complete.

PERFORMANCE CHECKLIST	STANDARDS	SAT	UNSAT	N/A
RECORD START TIME ________				
1. Refer to BwOP AF-7. **(CUE: After examinee locates procedure, provide a copy.)**	Locate and Open BwOP AF-7.	☐	☐	☐
2. Perform actions at 2AF01J. **(CUE: Reset pushbutton has been depressed.** **Select Switch is in Auto.** **Ready to Start light is lit.** **Governor switch is off.)**	Perform the following at 2AF01J: • PUSH the Reset Pushbutton to clear circuit. • VERIFY the Select Switch is in AUTO position. • VERIFY "Ready to Start" light is LIT. • VERIFY Diesel Governor Switch is in OFF position.	☐	☐	☐
3. Verify the Air Box Trip is reset. **(CUE: Air Box Trip annunciator is not lit.** **Air Box Trip lever is in normal position.)**	VERIFY the Air Box Trip is Reset as follows: o CHECK "AIR BOX TRIP" annunciator NOT LIT. o Air Box Trip Lever (on back side of engine) in Normal position.	☐	☐	☐
4. Start Lube Oil systems. **(CUE: Gear box lube oil pump control switch is in start.** **Aux lube oil pump control switch is in start.** **After examinee locates inlet and outlet pressure gages, indicate that the inlet is 28 psig, and the outlet is 26 psig.)**	START Lube Oil Auxiliary Systems as follows at the local control panel: • Aux FW Pp 2B Gear Box Lube Oil Pp, 2AF01PB-C. • Aux FW Pp 2B Lube Oil Pp, 2AF01PB-A. • VERIFY Lube Oil Filter Differential Pressure is < 4 psid.	☐	☐	☐

PERFORMANCE CHECKLIST	STANDARDS	SAT	UNSAT	N/A
5. Align AFW system discharge flowpath. **(CUE: As US, direct that neither step 15 nor 16 need be performed.)**	ALIGN 2B AFW pump discharge flowpath in accordance with US direction: • Contact US to determine if CLOSURE of B Train 2MOV-AF013s or 2AOV-AF004B will be necessary.	☐	☐	☐
6. Attempt start 2B AFW pump locally.	Attempt START 2B AFW Pump locally at 2AF01J as follows:			
(CUE: Engine start switch is in Manual and the 'Ready to Start light' is not lit.	• PLACE the Engine Start Control Switch to MANUAL.	☐	☐	☐
Start pushbutton is being depressed and held. Engine start noises are NOT heard/NOT cranking.	• DEPRESS and HOLD the START pushbutton.			
Alternate battery bank is selected. **Reset PB is pushed.** **Start PB depressed and held, but no cranking noises heard.** **If asked as US, acknowledge failure to start and re-emphasize I need that AFW pump running ASAP and to continue attempts to get AFW restored.**	• SELECT Alternate Battery bank. • PUSH the RESET pushbutton. • DEPRESS and HOLD the START pushbutton.			

Note: From initiating cues and task conditions, the examinee should determine he should skip the rest of step 17, all of step 18 and 19, and go to step 20 of BwOP AF-7.

PERFORMANCE CHECKLIST	STANDARDS	SAT	UNSAT	N/A
7. Prepare to start 2B AFW pump from 2AF03J (at 364' M-16 or M-18).	Prepare to start 2B AFW pump from 2AF03J as follows:	☐	☐	☐
(Note: Examinee may decide to not dispatch an operator to the 2B AFW pump since the examinee is already there.) **(CUE: As local operator, acknowledge being dispatched to 2B AFW pump. As U2 NSO acknowledge incoming alarm.)**	o DISPATCH an operator to inspect 2AF01PB (2B AFW pump). o Report incoming alarm at 2-3-B6, "AF PUMP AUTO START at 2PM06J to the MCR.			

Note: If an operator was dispatched to the 2B AFW pump in the previous step, then prior to attempting the start of the 2B AFW pump from the 364' elevation, the examinee should alert this operator to the upcoming start attempt.

PERFORMANCE CHECKLIST	STANDARDS	SAT	UNSAT	N/A
*8. Start 2B AFW pump.	Start 2B AFW pump by performing the following:	☐	☐	☐
(CUE: After simulating rotating the switch, provide cue that the switch is in the selected position.	o PLACE 2HS-AF157 in the START Position. OR o PLACE 2HS-AF157 in the START WITH BYPASS Position. THEN			
Running light is lit.)	• VERIFY the RUNNING Light at 2HS-AF157 is Lit.			

Note: The examinee may ask the operator he dispatched to check the recirc flow. If this happens, then cue the examinee that the operator was called away to perform another task.

PERFORMANCE CHECKLIST	STANDARDS	SAT	UNSAT	N/A
9. Verify AFW pump recirc flow ≥ 85 gpm.	VERIFY Recirc Flow is ≥ 85 GPM on 2FI-AF096.	☐	☐	☐
(CUE: After locating gage, indicate flow at 87 gpm.)				

PERFORMANCE CHECKLIST	STANDARDS	SAT	UNSAT	N/A
10. Verify cooling flow adequate.	VERIFY SX Cooling flow adequate as follows:	☐	☐	☐
(CUE: After valves are located, cue that the position indicator is making contact with the limit switch.	• VERIFY 2AOV-SX173 OPEN. • VERIFY 2AOV-SX178 OPEN.			
After locating Engine Oil temp, indicate 160.	• MONITOR Engine Oil Temperature $\leq$ 220 deg F.			
After locating Oil Clr Outlet Temp, indicate 110.	• MONITOR Oil Cooler Outlet Temperature 40-128 deg F.			
After locating Gear Changer Oil Clr Outlet Temp, indicate 110.	• MONITOR Gear Changer Oil Cooler Outlet Temperature 40-130 deg F.			
Provide copy of BwOP AF-7T1 for initiation, then after time, date, and number of cranks logged, inform the examinee that another operator is now on the scene and will monitor operation and take readings on the logsheet.)	• INITIATE BwOP AF-7T1 with today's date, current time, and number of cranks if known before start.			
The # of cranks would only be known if the examinee had another operator at the engine when the start occurred. If the operator did, then cue that the # of cranks was 1.				

(CUE:) THIS COMPLETES THIS JPM.

RECORD STOP TIME ______________________

COMMENTS:

INITIAL SUBMITTAL OF SCENARIOS

WITH NRC COMMENTS

FOR THE BRAIDWOOD INITIAL EXAMINATION - OCTOBER 2001

Simulation Facility	Braidwood	Scenario No.:	01-1	Operating Test No.: 1
Examiners:	____________	Applicant:	____________	SRO
	____________		____________	RO
	____________		____________	BOP

Initial Conditions: IC-18, 75% power, steady state, MOC.

Turnover: Ramp to full power requested by Electric Operations. MESACs were completed on 1D SGWLC instrumentation on the previous shift. 1A MFP is out of service due to breaker cubicle work.

Event No.	Malf. No.	Event Type*	Event Description
Preload	~~CH11A and CH11C~~ FW48B FW43 MS01A-D, 100 FW45E, 100 Override ZDI1AF013E AUTO	~~C BOP~~ C BOP C BOP C RO BOP SRO C BOP C BOP SRO	~~1A and 1C RCFCs fail to auto shift from hi to low speed on SI.~~ 1B AFW pump fails to auto start, can be manually started. 1A AFW pump fails to auto or manually start. All MSIVs fail at 100% open, no closure available. 1AF005E potentiometer fails to 100% demand. 1AF013E stuck open.
1		R RO SRO N BOP	Raise Reactor Power using rods and dilution Ramp up turbine power from 75% to full power.
2	RX06O, 0	I BOP SRO	1LT549, 1D SG Controlling Water Level Channel fails low.
3	RX13A, 0	I RO SRO	1LT-459, Controlling PZR Level Channel fails low.
4	CV09, 50	C RO SRO	TCV-130A modulates closed
5	MS04D, 100	C BOP SRO	1MS018D, 1D SG PORV fails open.
6	FW09A, 100	C BOP SRO	1FW510, 1A SG Feed reg valve fails open.
7	FW19A, 2.0	M BOP RO SRO	1A SG Feed line break (2 MLB/HR) inside containment. 4 faulted steam generators. ~~Manually start 1B AFW pp~~
~~8~~ 9	MS01-A-D, 100	C	All MSIVs fail open
~~6~~ 8	1A/1B AFW pp FTS	C	1A AFW F.T.S 1B AFW F.T.AS, can be man started.

*(N)ormal, (R)eactivity (I)nstrument, (C)omponent, (M)ajor Transient

SCENARIO 01-1 OVERVIEW

The scenario begins with the plant at 75% power and a ramp up to full power is requested via the turnover. The turnover includes information that MESACs were completed for 1D SGWLC instrumentation on the previous shift and 1A MFP is out of service for breaker cubicle work.

After clearly observable plant response to the requested reactivity change, the controlling channel of S/G Water Level instrumentation for 1D S/G will fail low causing a demand for more feed flow to the 1D S/G. The BOP will diagnose the failure and take manual control of the 1D S/G feed regulating valve. The crew will enter and perform actions of 1BwOA INST-2 Attachment E, "OPERATION WITH A FAILED INSTRUMENT – NARROW RANGE S/G LEVEL CHANNEL FAILURE", to stabilize the plant and trip the bistables for the failed channel. The SRO will investigate Tech Specs. LCO 3.3.1 condition E and LCO 3.3.2 condition D will apply. Maintenance will investigate as requested.

After the bistables are tripped for the failed S/G water level control channel, a failure of the controlling channel of Pzr Level will occur causing letdown to isolate. The crew will respond by diagnosing the failure of the level channel and entering and performing the actions of 1BwOA INST-2 Attachment C, "OPERATION WITH A FAILED INSTRUMENT – PRESSURIZER LEVEL CHANNEL FAILURE". An alternate controlling level channel will be selected, letdown will be restored, and the crew will take actions to restore pressurizer level to the program value. Bistables will be tripped for the failed channel, and Tech Specs will be investigated. LCO 3.3.1 condition K will apply. Maintenance will investigate as requested.

Following the restoration of letdown and bistable tripping, the letdown temperature control valve for the on line letdown heat exchanger will close. Letdown temperature will increase causing a high temperature diversion around the mixed bed demineralizers. Manual control of the temperature controller is available and will be necessary to restore letdown temperature to normal. Annunciator response procedures will be referenced to respond to the failure.

When manual control of the letdown temperature control valve is selected, the 1D S/G PORV controller will cause the 1D S/G PORV to open. RCS Tave will decrease causing control rod motion in the outward direction. The crew will investigate the cause of the temperature decrease and diagnose the inadvertent PORV failure. Emergency closure of the PORV will be available from the control room and the PORV will be locally isolated if directed by the crew. The SRO will determine Tech Spec 3.7.4 applies.

A failure open of the 1A Feed Regulating Valve will cause a High-2 SG Level Turbine Trip if the crew does not manually trip the reactor first. A 1A S/G feed line break inside of containment will occur when the 1A FWIV closes requiring a safety injection. 1BwEP-0, "REACTOR TRIP OR SAFETY INJECTION" will be entered. Containment pressure will exceed the Containment Spray actuation setpoint. Manual action will be required to start 1 train of RCFCs and the 1B AFW pump. The 1A AFW pump will fail to start. A diagnosis of a Faulted S/G will cause transition to 1BwEP-2, "FAULTED SG ISOLATION". Further diagnosis will determine 4 faulted S/Gs exist due to failure of all MSIVs to close and a transition to 1BwCA-2.1, "UNCONTROLLED DEPRESSURIZATION OF ALL S/Gs" will be made. Depending on the timing, a transition to 1BwFR Z.1, "RESPONSE TO CONTAINMENT HIGH PRESSURE," will occur after exiting the Reactor Trip/Safety Injection procedure. Manual operator action will be required to throttle

Comments: ______________________________

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AFW flow to a minimum to the SGs. Local operator action will be required to throttle B Train AFW flow to the faulted 1A S/G due to a failure of the potentiometer and a stuck open isolation valve. Containment Spray may be terminated (depending on the amount of secondary water inventory remaining in the SGs and the RCS temperature) before reaching the LO-2 RWST setpoint for auto swap over to the containment sump and an unnecessary injection of sump water into the RCS. NaOH addition to the CS water will be stopped due to the break being on a secondary system. If the LO-2 RWST level is reached, then the crew will transition to 1BwEP ES-1.3, TRANSFER TO COLD LEG RECIRCULATION and then back to the procedure and step in effect. The crew will proceed to terminate the safety injection in 1BwCA 2.1. Scenario termination is after stopping high head injection flow and re-establishing charging flow.

Critical Tasks

E-0—F	Establish the minimum required AFW flow rate to the SGs before transition out of E-0, unless the transition is to FR-H.1, in which case the task must be initiated before RCPs are manually tripped per FR-H.1.
ECA-2.1---A	Control the AFW flow rate to not less than 45 gpm per SG in order to minimize the RCS Cooldown rate before a severe (orange path) challenge develops to the integrity CSF.

Comments: ______________________________

SIMULATOR OPERATOR NOTES:

1A/1C auto sh. speed.

Simulator Setup:
Init IC 18, MOC, Xenon equilibrium, steady state.
Align switches, "Perform ready for Training" checklist.
Insert PRELOAD Events:
Place 1A MFP control switch to Pull Out and hang tag.
IMF CH11A and CH11C 1A and 1C RCFCs fail to auto shift from high to low speed on SI.
IMF FW48B 1B AFW pump fails to auto start, can be manually started.
IMF FW43 1A AW pump fails to auto or manually start.
IMF MS01A-D All MSIVs fail 100% open, no closure available.
IMF FW45E 100 1AF005E potentiometer fails at 100% demand.
IOR ZDI1AF013E AUTO 1AF013E stuck open.

Event 1 Power ramp from 75% up to 100%.
As SM acknowledge ramp initiation.
As RP/HP/Chemistry acknowledge sample requirements for power change > 15% in one hour.

Event 2 1D SG Controlling water level channel fails low (1LT-549).
SDG: RX19
Malf: RX06O, 0 severity, no ramp.
Initiate event after clearly observing reactivity change/response of plant from requested power ramp up or upon lead examiner cue.
Role play as U-2 admin and/or extra NSO to accomplish bistable tripping. Acknowledge all info passed to the SM, WEC, and maintenance.

SDG: RX19

Cabinet door #2 Open				RF	RX21	OPEN
P-14	LB549A	C2-753	BS-1	RF	RX069	TRIP
LO-2	LB549B	C2-753	BS-2	RF	RX070	TRIP
Cabinet door #2 Close				RF	RX21	CLOSE

Event 3 Controlling PZR level channel fails low (1LT-459).
SDG: RX6
Malf: RX13A, 0 severity, no ramp.
Initiate event after bistables are tripped and tech specs are investigated for ~~event 2, or~~ at lead examiners cue.
Role play as U-2 admin and/or extra NSO to accomplish bistable tripping. Acknowledge all info passed to the SM, WEC, and maintenance.

SDG: RX6

Cabinet door #1 Open	RF	RX20	OPEN

Comments: ______________________________

Hi Level Trip	LB459A	C1-751	BS-1	RF	RX029	TRIP
Cabinet door #2 Close				RF	RP20	CLOSE

Event 4 On line letdown heat exchanger (1A) cooling flow control valve fails closed, (1TCV-130A).
SDG: CV2 and CC6
Initiate after bistable is tripped and tech specs are investigated for event 3, or at lead examiners cue.
Malf: CV09, 50
Intent is to cause operator to have to take manual control of the TCV-130 controller and restore letdown temperature without having to swap letdown heat exchangers. Manual control via the M/A station is available on this malfunction. Acknowledge all info passed to the SM, WEC, and maintenance. If dispatched as local operator, use first check and report no obvious problems at the valve. Valve appears to operate smoothly from local observation. (An additional simulator manipulation may be necessary as follows: On SDG CC6, may have to close 1CC9452B to reduce CC flow to the 1A letdown Hx, because the malfunction to cause the 1CC130A to close, does NOT fully close the valve. If this is the case, then as Manual Control of the M/A station for 1CC130A/B is taken and demand increased, reopen 1CC9452B to restore cooling flow. The original position of the 1CC9452B valve is ~50% open.)

Event 5 1D SG PORV 1MS018D, fails open. if asked risk is yellow.
SDG: MS4
Initiate at after letdown temperature is stabilized or at lead examiners cue.

Malf: MS04D, 100, no ramp
If dispatched to the controller box in the AEER, report no obvious problems. If dispatched to locally close 1MS019D, wait 5 minutes, use first check, and then use RF: MS54 CLOSE to close the isolation valve. Report 1MS019D closed when completed. Acknowledge all info passed to the SM, WEC, and maintenance.

Events 6 and 7 1A SG Feed regulating valve (1FW510) fails open with no manual control available causing a feed line break inside containment on 1A feed line when feedwater isolates.

Initiate events 6 and 7 after tech specs are investigated for the 1D SG PORV, or at the lead examiners cue.
Action:
Malf: FW09A, 100, 30 second ramp.
SDG: FW8
Malf: FW19A, 2.0 Mlb/hr, when FW009A is full closed.
Trigger: When FWV1FW009A == 0, then IMF FW19A 2

Acknowledge all info passed to SM, WEC, and others regarding reactor trip and SI and procedure transitions.
Role play as STA when asked and monitor the Status Trees. Pay particular attention to the Containment Status Tree as the intent of the scenario is reach the Hi-3 setpoint. Actions in EP-0 will ensure CS is going, however if monitoring the Status Trees identifies an Orange path, report it to the US as usage rules apply.

If dispatched as local operators to check/investigate equipment, report as follows for the requested actions:
All running equipment is operating properly.
1A Auxiliary Feed Pump Breaker has an over current flag on phase C. Bus 141, cub 8.

Comments: ______________________________

No obvious problems at the high speed breakers for the 1A and 1C RCFCs.
Bus 131X Compt 5C (for 1A RCFC) and Compt 3C (for 1C RCFC).
Need the floor plugs removed to get to the 1AF013E.

SDG: FW13
Use RF: FW161 to position the hand wheel for 1AF005E as requested. (8 will ~ 45 gpm)

Maintenance will attempt to locally close any/all MSIVs (but will be unsuccessful).

SDG: SIP
Use RF: ED55E to energize 1SI8806 at 131X1A:P3,
and RF: ED72B to energize 1SI8813 at 132X4A:L3
if 1BwEP ES-1.3 is entered.

Comments: ____

Scenario No: 01-1		Event No. 1
Event Description:		Raise turbine load and reactor power.
Time	Position	Applicant's Actions or Behavior
	CUE	Turnover information includes request from Electric Operations for an increase in Unit 1 MW to full load (1260 MW) to begin ASAP at 5 MWe/minute.
	US	Implement actions of 1BwGP 100-3, Rev. 21 step 59. • Initiate load swing instruction sheet (1BwGP 100-4T2 Boration Dilution Boundary Calculation). o Contact chemistry and Health Physics for load change > 15% in one hr. • Inform SM of plant Status, and Elec Ops of ramp start.
	CREW	Review Applicable Precautions, Limitations and Actions.
	RO	Verify rod position and boron concentration. Perform reactivity manipulation calculation to determine amount of RCS dilution and expected rod outward movement to maintain Delta I within the limits of BwCB-1 Fig. 19. Determine required dilution volume by: o Effects of previously performed dilutions. o Braidwood Boration Dilution Tables. Initiate Dilution in accordance with BwOP CV5, Rev. 13: • Determine required Primary Water flow rate. • Set 1FK-111 Pw/Total Flow Control to desired dilution rate. • Set 1FY-0111 Primary Water Control Preset Counter to desired volume. • Place MAKE-UP CONT Switch to STOP position. • Set MU MODE SELECT Switch to ALT DIL position. • Place MAKE-UP CONT Switch to START. o Verify proper operation of valves (1CV111A throttles open, PW flow indicated on recorder). OR Batch Addition: • OPEN 1CV110B. • OPEN 1CV111A. When desired amount of Primary Water added: • CLOSE 1CV111A. • CLOSE 1CV110B.

Comments: ______________________________

Scenario No: 01-1		Event No. 1
Event Description:		Raise turbine load and reactor power.
Time	Position	Applicant's Actions or Behavior
	BOP	Initiate turbine load increase: • VERIFY the DEHC IMP IN, SPEED IN, and MW IN half of the pushbuttons are illuminated. • DEPRESS the LOAD RATE MW/MIN pushbutton. • ENTER the desired load rate ($\leq$ 5). • DEPRESS the ENTER pushbutton. • DEPRESS the REF pushbutton. • ENTER the desired MW on the REFERENCE DEMAND Window using the numbered pushbuttons (1120). • DEPRESS the ENTER pushbutton. • DEPRESS the GO pushbutton when directed by the US/RO. • VERIFY load begins to increase.
	RO	Monitor power increase: • Monitor Reactor power, Tave, and Delta I. • Verify control rods automatically move to maintain Tave within $\pm$ 1.0 degree F of Tref. If Diluting: • Monitor VCT level. o Verify RCS boron concentration decreasing. • Monitor PW/Total counter. • Verify dilution auto stops at preset value. • Return Reactor Makeup system to blended flow at current boron concentration.
		Note: Following clearly observable plant response from the reactivity changes, Event 2 is entered.

Comments: ____

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Scenario No: 01-1		Event No. 2
Event Description:		1LT-549, 1D SG Controlling Water Level Channel Fails LOW.
Time	**Position**	**Applicant's Actions or Behavior**
	CUE 7:40	Annunciators: 1-15-D3 SG FLOW MISMATCH STM FLOW LOW 1-15-D5 SG 1D LVL LO-2 RX TRIP ALERT 1-15-D9 SG 1D LEVEL DEVIATION HIGH LOW Indications: Increasing Feed Flow to 1D SG Increasing 1D SG Level Increasing Feed regulating valve demand (1FW540) Decreasing RCS Tave
	BOP	Diagnose failure of 1LT-549. Announce controlling SG Narrow Range Level Channel Failure. Take manual control of 1FW540, and control feed flow to stabilize/restore level. Perform actions of 1BwOA INST-2 as directed by US: • Manually controls feed flow (Feed Reg valve 1FW540, and/or Main Feed Pump Speed Control). • SELECTS operable channel (1LT559). • Re-establishes Automatic level control. • Coordinates Bistable tripping for failed channel. (Expected alarm: 15-D-8)
	US 7:45 7:48	Diagnose/Acknowledge failure of Controlling Channel Narrow Range Water Level on 1D SG. Enter 1BwOA INST-2 Attachment E, Rev. 57B, "NARROW RANGE SG LEVEL CHANNEL FAILURE" and direct actions: • If affected SG level is NOT NORMAL, place 1FW540 in MANUAL and restore level. • SELECT operable channel for control. • Re-establish automatic level control. • Tripping of level bistables (2) for 1D SG. • Determines AMS is NOT failed. • Refers to Tech Specs 3.3.1. cond E, 3.3.2. cond D, and 3.3.3., and determines a 6 hour clock to get the channel tripped applies. • Informs SM of plant status. • Orders WEC to generate AR, CR, and get maintenance involved for repairs.

Comments: ____

Scenario No: 01-1		Event No. 2
Event Description:		1LT-549, 1D SG Controlling Water Level Channel Fails LOW.
Time	Position	Applicant's Actions or Behavior
	RO	Monitors Reactor and Primary parameters for expected effects: • Reactor power and Delta I (makes recommendation with respect to continued ramp). • Tave and control rod motion. • Reports status to US. Assists BOP as directed by US: • Investigates BwARs.
		Note: Following Tech Spec determination, initiate Event 3.

Comments: ______________________________

Scenario No: 01-1		Event No. 3
Event Description:		1LT-459 Controlling Pressurizer Level Channel Fails LOW.
Time	**Position**	**Applicant's Actions or Behavior**
	CUE	Annunciators: 1-12-A4 PZR LVL LOW HTRS OFF LTDWN SECURED 1-12-A5 PZR HTR TRIP 1-12-B4 PZR LEVEL CONT DEV LOW 1-12-C5 PZR PHASE LOSS OR REVERSAL 1-12-D5 PZR HTR SCR CLG FAN FAILURE
	RO 7:50	Diagnose failure of 1LT-459. Announce failure and loss of letdown flow. Perform actions of 1BwOA INST-2 Attachment C, Rev. 57B, "PRESSURIZER LEVEL CHANNEL FAILURE" as directed by US: • Evaluate PZR level. If NOT NORMAL, takes manual control (PZR Master Level controller and/ or 1CV121) to restore level. o Reduces charging to a minimum (seal injection), then close either 1CV8105 or 1CV8106. • SELECT operable channel (461/460, left position) for PZR level control. o SELECT operable channel to level recorder (ANY but 459, normally on 460). • VERIFY PZR level > 17%. • Re-establishes Letdown IAW BwOP CV-17, "ESTABLISHING AND SECURING NORMAL AND RH LETDOWN FLOW" (may be performed by either RO or BOP). • Restores Variable heaters to NORMAL. • Restores Automatic level control (PZR Master Level Controller and/or 1CV121). • Coordinates bistable tripping (expected alarm 1-12-A3).

Comments: ______________________________

Scenario No: 01-1		Event No. 3
Event Description:		1LT-459 Controlling Pressurizer Level Channel Fails LOW.
Time	Position	Applicant's Actions or Behavior
	US	Diagnose/Acknowledge failure of 1LT-459, Controlling PZR Level channel and loss of letdown. Enters 1BwOA INST-2 Attachment C, "PRESSURIZER LEVEL CHANNEL FAILURE" and directs actions: • Orders manual control of PZR level if not normal. o Charging reduced to a minimum (seal injection), then 1CV8105 or 1CV8106 closed. • Operable channel selected for control. • Operable channel selected for recorder. • Re-establish letdown when level >17%. • Restore heaters to normal. • Restore Automatic level control (Master controller, and/or 1CV121). • Bistable Tripping. • Refers to Tech Specs 3.3.1. cond K, 3.3.4., 3.3.3., and determines a 6 hr action to trip bistables applies. • Informs SM of plant status. • Orders WEC to generate AR, CR, and get maintenance involved.
	BOP	Performs actions as directed by US/RO: • Re-establishes Letdown IAW BwOP CV-17, "ESTABLISHING AND SECURING NORMAL AND RH LETDOWN FLOW" (may be performed by either RO or BOP). • Assists RO as directed by US/RO with panel monitoring. • Investigates BwARs. o Holds/controls ramp

Comments: ____

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Scenario No: 01-1		Event No. 3
Event Description:		1LT-459 Controlling Pressurizer Level Channel Fails LOW.
Time	**Position**	**Applicant's Actions or Behavior**
	RO/BOP	Re-establishing Letdown per BwOP CV-17: • VERIFY CLOSE 1CV8149A,B, and C . o Assumes CC is still aligned properly to Letdown HX. • PLACE 1CV-131 in MANUAL and RAISE demand to 40%. • PLACE 1CC-130 in MANUAL and RAISE demand to 60%. • VERIFY OPEN 1CV459 and 1CV460. • VERIFY OPEN 1CV8324A/B and 1CV8389A/B. • VERIFY OPEN 1CV8160 and 1CV8152. • VERIFY OPEN 1CV381B. • VERIFY CLOSE 1CV381A. • VERIFY OPEN 1CV8401A/B. • VERIFY CLOSE 1CV8145 • VERIFY OPEN 1CV8147A/B. • VERFIY OPEN 1CV8105 and 1CV8106. • ADJUST in MANUAL 1CV121 to establish ~100 gpm charging flow. • ADJUST 1CV182 to obtain 8-10 gpm seal injection flow to each RCP. • SIMULTANEOUSLY OPEN 1CV8149A/B/C and ADJUST 1CV131 to control letdown pressure between 360 and 380 psig (1PI-131) • PLACE 1CV131 in AUTO and verify proper pressure control. • ADJUST 1CC-130 to control temperature between 90 and 115 degrees F (1TI-130). • PLACE 1CC-130 in AUTO and verify proper temperature control. • PLACE 1CV-121 in AUTO when conditions allow automatic charging control. • VERIFY/PLACE 1PR006 in service.
		NOTE: Once letdown has been restored, initiate EVENT 4.

Comments: ____________________

Scenario No: 01-1		Event No. 4
Event Description:		Failure of 1TCV-130A to control temperature / modulates closed.
Time	**Position**	**Applicant's Actions or Behavior**
	CUE	Annunciators: 1-9-E2 LTDWN TEMP HIGH Indications: Letdown Hx Outlet temperature decreasing (1TI-130) 1TCV-129 Diverts to VCT
	RO	Announces increasing letdown temperature trend and diagnoses failure of 1CC-130A closed. o Dispatches operator to locally check valve and reports status to US. • VERIFY High Temperature divert valve diverts letdown flow and reports to US. • Takes manual control of 1CC-130 and restores cooling flow. Verifies 1-9-E2 clears. • Determines auto control problem and reports to US. • Restores letdown flow to VCT when directed by US.
	US	Diagnose/Acknowledge failure of 1CC-130A closed. Directs use of BwARs. Directs manual control of 1CC-130 Controller to re-establish proper letdown cooling flow. • Determines auto control problem. o Dispatches operator to locally check valve and reports status to crew. o Contacts Chemistry for Demin Effluent sample. • Re-establish letdown flow to VCT. • Informs SM of status. • Orders WEC to generate AR, CR, and get maintenance involved for repairs.
	BOP	Reviews BwARs Monitors control board indications. o Holds/controls Ramp. o Dispatches operator to locally check valve and reports status to US.

Comments: ____

Scenario No: 01-1		Event No. 4
Event Description:		Failure of 1TCV-130A to control temperature / modulates closed.
Time	Position	Applicant's Actions or Behavior
		NOTE: After letdown temperature has been restored, initiate event 5.

Comments: ______________________________

Scenario No: 01-1		Event No. 5
Event Description:		1MS018D, 1D SG PORV Fails OPEN.
Time	**Position**	**Applicant's Actions or Behavior**
	CUE	Indications: RCS Tave decreasing Control rods stepping out Reactor Power increasing Reactor power/ turbine power mismatch increasing Red Porv OPEN position indication light lit. LVDT meter indication increasing above 0%.
	BOP	Diagnoses 1D SG PORV OPEN, determines SG pressure is below setpoint (1115 psig) and reports failure to US. Performs actions directed by US: • Take MANUAL control at the M/A Station and attempt to reduce demand. • Report MANUAL control has no effect to US. • PLACE EMERGENCY CLOSE switch to CLOSE. o Report/Acknowledge SG 1D PORV TROUBLE annunciator (1-15-D10) as expected alarm. • REPORT 1D SG PORV CLOSED. o Dispatch operator to AEER to PORV controller box. o Dispatch operator to locally isolate 1MS018D by closing 1MS019D. • Report status to US.
	US	Diagnose/Acknowledge failure of 1D SG PORV OPEN and direct actions: o Determine SG pressure < PORV setpoint. • Attempt MANUAL Control via M/A station to CLOSE PORV. • PLACE EMERGENCY CLOSE switch to CLOSE. o Dispatch operator to isolate PORV by closing 1MS019D. • Inform SM of plant status. • Order WEC to generate AR, CR, and get maintenance involved for repairs. • Refer to Tech Spec 3.7.4. (30 days to restore operability). MAY o Refer to Tech Spec 3.6.3. (not applicable except MSIV's)

Comments: ____

Scenario No: 01-1		Event No. 5
Event Description:		1MS018D, 1D SG PORV Fails OPEN.
Time	Position	Applicant's Actions or Behavior
	RO	Diagnose/Acknowledge failure of 1D SG PORV OPEN. Monitor Reactor and Primary parameters for effects and expected response: • Reactor Power • Tave, Delta I and rod motion. • Assist as directed by US. • Investigate BwARs.
		NOTE: After PORV is Closed/Isolated, and Tech Specs actions determined, initiate event 6.

Comments: ______________________________

Scenario No: 01-1		Event No. 6
Event Description:		1A SG Feed regulating valve (1FW510) fails OPEN with no manual control available.
Time	Position	Applicant's Actions or Behavior
	CUE	Annunciators: 1-15-A3 SG FLOW MISMATCH STM FLOW LOW 1-15-A9 SG 1A LEVEL DEVIATION HIGH LOW Indications: Increasing Feed Flow Increasing 1A SG level
	BOP	Diagnose feed flow problem affecting 1A SG and increasing level toward automatic trip setpoint. Attempt manual control of 1A Feed Regulating valve and report no manual control available. Recommend manual reactor trip. Perform actions directed by US.
	US	Diagnose Increasing 1A SG level. Direct manual control of 1FW510 to reduce feed flow; acknowledge NO manual control available. Order manual reactor trip. Inform SM of plant status.
	RO	Diagnose Increasing 1A SG level. Monitor reactor and primary parameters. Insert manual reactor trip as directed by US.
		Ensure event #7 actuates when main feedwater isolates on the reactor trip

Comments: ____

Scenario No: 01-1		Event No. 7, 8, 9
Event Description:		Reactor trip resulting in 1A SG Feed line break inside containment, all MSIVs fail open, 4 faulted SGs. Manual actions required to establish and control AFW flow, and properly align containment cooling fans.
Time	Position	Applicant's Actions or Behavior
	CUE	Annunciators: 1-1-A2 CNMT DRAIN LEAK DETECT FLOW HIGH 1-3-D4 CNMT PRESS HIGH 1-11-E1 CNMT PRESS HIGH SI/RX TRIP 1-15-A/B/C/D4 SG 1A/B/C/D LEVEL LOW 1-15-E4 P-4 FW ISOL Indications: 1A and 1C RCFC High Speed Fan Run Lights lit > 20 Seconds after SI. 1A and 1B AFW pumps NOT running after Auto Start signals generated. MSIV open position lights lit after MSIV Isolation signals generated. AFW Flow NOT changing when AF flow control/isolation valves control switches manually adjusted.
	US	Enter 1BwEP-0, "REACTOR TRIP OR SAFETY INJECTION" and direct actions.
	RO	Perform actions of 1BwEP-0: VERIFY Reactor Trip: • Rod bottom lights Lit. • Reactor Trip and Bypass breakers Open. • Neutron Flux Decreasing. CHECK SI Status: • Determine SI is needed (due to unavoidable reaching of HI-1 Cnmt Pressure, and/or Low Steam line Pressure setpoints) and MANUALLY actuate SI. CHECK ECCS pumps running: • Both CV pumps. • Both RH pumps. • Both SI pumps.

Comments: ____

Scenario No: 01-1		Event No. 7
Event Description:		Reactor trip resulting in 1A SG Feed line break inside containment, all MSIVs fail open, 4 faulted SGs. Manual actions required to establish and control AFW flow, and properly align containment cooling fans.
Time	Position	Applicant's Actions or Behavior
	BOP	Perform actions of 1BwEP-0: VERIFY Turbine Trip: • All TVs and GVs Closed. VERIFY power to 4 KV ESF buses: • Bus 141 and 142 energized. VERIFY FW Isolation: • FW pumps tripped. • FW Isolation Monitor Lights Lit. • FW pumps discharge valves (1FW002A,B, and C) Closed. VERIFY RCFCs in Accident Mode: • Determine ~~NOT all~~ Group 2 RCFC Accident mode lights are lit. • Manually stop 1A and 1C RCFC High Speed Fans. • Close 1SX112A and 1SX114A. • Open 1SX147A. • Verify open 1SX016A and 1SX027A. • Manually start 1A and 1C RCFCs Low Speed Fans after 20 second time delay. VERIFY CNMT Isolations: • Phase A, Group 3 Isol Monitor lights lit. • Ventilation Group 6 Isol Monitor lights lit.
	BOP **CT** **E-0--F**	VERIFY AF SYSTEM: o Report neither AFW pump auto started. o Attempt start of Both AFW pumps. • Manually Start 1B AFW pump. o Report failure of 1A AFW pump to manually start (after attempt). o Report 1B AFW pump was manually started (after attempt). o Dispatch operator(s) to check 1A AFW pump and breaker to investigate failure to start. o Dispatch operator(s) to check 1B AFW pump to ensure proper operation. • 1AF013E-H open (No running pump on Train A). • 1AF005E-H throttled. (No running pump on Train A)

Comments:

Scenario No: 01-1		Event No. 7
Event Description:		Reactor trip resulting in 1A SG Feed line break inside containment, all MSIVs fail open, 4 faulted SGs. Manual actions required to establish and control AFW flow, and properly align containment cooling fans.
Time	**Position**	**Applicant's Actions or Behavior**
	BOP	VERIFY Pumps Running: • Both CC pumps. • Both SX pumps.
	RO/BOP/ US	DETERMINE Steam line Isolation Required: • Any SG pressure < 640 psig (or will become < 640 psig). • Cnmt pressure approaching 8.2 psig or has exceeded 8.2 psig. • Actuate MSIV Isolation (Both switches, and the individual MSIV switches) and verify Bypasses closed. DETERMINE Steamline Isolation has NOT occurred.
	Note	**CS will eventually be required due to 4 SGs blowing down inside containment. When pressure exceeds 20 psig, then following step must be performed.**
	BOP	CHECK if Containment Spray required: • CMNT pressure increased to > 20 psig • Stop All RCPs. • Group 6 CS Monitor lights lit. • Group 6 Phase B Isolation Monitor lights lit. • CS Eductor Suction Flow > 15 gpm (1FI-CS013 and 1FI-CS014). • CS Eductor Additive Flow > 5 gpm (1FI-CS015 and 1FI-CS016).
	BOP	VERIFY Total AFW Flow: • > 500 gpm. • Control feed flow to maintain narrow range SG levels 10% (31% Adverse) to 50%. • Verify no SG level is increasing in an uncontrolled manner.
	RO/BOP	VERIFY ECCS Valve Alignment: • Group 2 Cold Leg Injection lights lit. ~~(except due, 1A AFW~~ reports exceptions.
	RO	VERIFY ECCS Flow: • High head flow (1FI-917) > 100 gpm. • SI pump flow (1FI-918/922) > 200 gpm when RCS pressure < 1700 psig.

Comments: ____

Scenario No: 01-1		Event No. 7
Event Description:		Reactor trip resulting in 1A SG Feed line break inside containment, all MSIVs fail open, 4 faulted SGs. Manual actions required to establish and control AFW flow, and properly align containment cooling fans.
Time	**Position**	**Applicant's Actions or Behavior**
	RO	CHECK at Least One PZR PORV Relief Path Available: • 1RY8000A and B (PORV Isolation Valves) at least one energized and open. • 1RY455A and 1RY456 (PZR PORVs) at least one in AUTO with Isolation valve open.

	BOP	VERIFY Main Generator Trip:
		• OCB 1-8 and 7-8 Open.
		• PMG Breaker Open
		VERIFY Emergency Diesel Generators Running:
		• Both EDGs running.
		• SX Cooling valves (1SX169A and 1SX169B) both open.
		• Dispatch Operator(s) to locally check EDG operation.
		
		VERIFY Ventilation Alignments:
		• Control Room:
		  • Outside air intake (Grid 2, 31-34J) < high alarm setpoint.
		  • Operating VC train Supply, Return and Make-up Fan running.
		  • Chilled Water pump and Chiller running.
		  • M/U Fan outlet damper not fully closed.
		  • M/U Filter light lit.
		  • VC Charcoal Absorber on-line (Bypass damper closed, inlet and outlet dampers open).
		  • Control Room DP > 0.125 " H2O (0PDI-VC038).
		
		• Aux Bldg:
		  • Inaccessible Filter Plenums (Only 2 Plenums with Charcoal Filter Units on line)
		
		• Fuel Handling Bldg:
		  • FHB Charcoal Absorbers (Only One train aligned).
		  • Fan running (0VA04CA or 0VA04CB).
		  • Inlet Isolation Damper Open.
		  • Flow Control Damper Open.
		  • Bypass Isolation Damper Closed.

	RO	CHECK PZR PORVs and Spray valves: • Normal Spray valves (1RY455B and 1RY455C) Closed. • PZR PORVs (1RY455A and 1RY456) Closed.

Comments: ______________________________

Scenario No: 01-1		Event No. 7
Event Description:		Reactor trip resulting in 1A SG Feed line break inside containment, all MSIVs fail open, 4 faulted SGs. Manual actions required to establish and control AFW flow, and properly align containment cooling fans.
Time	Position	Applicant's Actions or Behavior
	RO	Maintain RCS Temperature Control: o With any RCP running, RCS Tave stable at or trending to 557 degrees F. o With No RCP running, RCS Cold Leg temperature stable at or trending to 557 degrees F.
	Note	**RCS temperature will eventually decrease below 557, and the following step must be performed.**

	BOP	If temperature is < 557 and decreasing, then perform the following:
		• Stop dumping steam.
		• Maintain total feed flow < 500 gpm until at least 1 SG is < 10 % (31% Adverse).
		• Verify the following valves closed:
		  • Steam Dump valves.
		  • MS RHTR Shutoff valves (1MS009A-D).
		  • MS RHTR S/U Purge Control Valves (1MS067A-D).
		  • MFP turbine HP Stop valves.

	Note	**Containment pressure may have reached the spray initiation point, and the RCPs could be already stopped. If so, the diagnostic for a faulted SG will be performed and not all of the following step will be necessary.**

	RO	CHECK Status of RCPs:
		• Determine if RCPS are running.
		• Check if RCPS should be stopped:
		  • ECCS flow- high head > 100 gpm; or SI pump > 200 gpm.
		  • RCS pressure < 1425 psig.
		  • Controlled cooldown NOT in progress, nor previously initiated.
		
		If yes to all of the above, Stop All RCPs.

	BOP	Determine faulted SG(s) exist: • Any SG pressure decreasing uncontrollably. • Any SG completely depressurized.

Comments: ____

Scenario No: 01-1		Event No. 7
Event Description:		Reactor trip resulting in 1A SG Feed line break inside containment, all MSIVs fail open, 4 faulted SGs. Manual actions required to establish and control AFW flow, and properly align containment cooling fans.
Time	**Position**	**Applicant's Actions or Behavior**
	US	Diagnose Faulted SG, and transition to 1BwEP-2, FAULTED STEAM GENERATOR ISOLATION: • Announce transition to 1BwEP-2, get acknowledgements from RO and BOP. • Inform SM of plant status, evaluate for GSEP. • Request STA report to control room for Status Tree Monitoring. **(See Examiner's Note this page)** Enter 1BwEP-2 and direct actions. Review Cautions and Note in 1BwEP-2.
	BOP	CHECK Main Steam Isolation: • Report all attempts to close MSIVs have been unsuccessful so far.
	US	Determine All Steam Generators are Faulted: • Check pressures in all SGs, and determine NONE are stable or increasing. • Announce Transition to 1BwCA-2.1 UNCONTROLLED DEPRESSURIZATION OF ALL SGs, and get acknowledgements from RO and BOP. • Inform SM of plant status, evaluate for GSEP. Enter 1BwCA-2.1 and direct actions. Review Note in 1BwCA-2.1.
	BOP	CHECK Secondary Pressure boundary: o Request engineering assistance to close MSIVs. • Verify MSIV Bypass valves all closed (1MS101A-D). • Check all SG PORVs Closed (1MS018A-D) • Check FW Isolated to all SGs (FWI Monitor lights lit). • Check SG Blowdown Isolation (1SD002A-H) and Sample Valves (1SD005A-D) all closed.
		Examiner's Note: The STA (role played by an instructor) will monitor Status Trees when requested by the US/Crew. The challenge to Containment will be identified by the STA and he will make the recommendation to transition to and implement 1BwFR-Z.1, "Response to Containment High Pressure" when containment pressure exceeds 20 psig, even if spray is already operating. Refer to page 28 for the evaluation of the crew when in 1BwFR-Z.1.

Comments: ____

Scenario No: 01-1		Event No. 7
Event Description:		Reactor trip resulting in 1A SG Feed line break inside containment, all MSIVs fail open, 4 faulted SGs. Manual actions required to establish and control AFW flow, and properly align containment cooling fans.
Time	**Position**	**Applicant's Actions or Behavior**
	BOP/RO **CT** **CA-2.1—A.**	Control Feed Flow to Minimize RCS Cooldown: • Determine cooldown rate in all RCS cold legs > 100 degrees F in any one hr. 2.1 • Decrease feed flow to 45 gpm to each steam generator. • Throttle 1AF005E controller to 0% • Report no control over feed flow to 1A Steam Generator. • Locally control 1AF005E via Handwheel • Set 1AF005E flow controller to 0%. • Dispatch operator to locally close 1AF005E. • Check Hot leg temperatures stable or decreasing.
	RO/BOP	Check Status of RCPs (Stopped due to CS Actuation). Monitor AF Suction Pressure: • 1-3-E7 AF PUMP SX SUCT VLVS ARMED not lit.
	RO	CHECK PZR PORVs and Isolation valves: • 1RY8000A and 1RY8000B energized and open. • 1RY455A and 1RY456 closed.

	BOP/US	Determine no SGTRs:
		• Reset Phase A Isolation.
		• Request Chemistry sample all SGs.
		• Check Secondary Radiation trends normal for plant conditions:
		  • SJAE/GS Exhaust.
		  • SG Blowdown Liquid.
		  • MS Line Rads.

	CREW	Determine RH pumps can be stopped: • Both RH pumps running with suction aligned to the RWST. • RCS pressure stable or increasing and > 325 psig. • Reset SI, and verify SI Actuated Light NOT Lit, and the AUTO SI BLOCKED Light Lit. • Stop RH pumps and place in standby.

Comments: ____

Scenario No: 01-1		Event No. 7
Event Description:		Reactor trip resulting in 1A SG Feed line break inside containment, all MSIVs fail open, 4 faulted SGs. Manual actions required to establish and control AFW flow, and properly align containment cooling fans.
Time	Position	Applicant's Actions or Behavior
		Note: If CS is stopped in the next step, Containment pressure must be monitored for CS restart conditions (≥ 20 psig). Crew may elect to allow CS to continue running to reduce Cnmt pressure much lower than 15 psig before stopping CS based on remaining water inventory in the faulted SGs and RCS temperature.
	BOP/US	Check if CS can be stopped: • Both CS pumps are running. • Reset CS signal. • Even if Spray additive tank low 2 lights are NOT lit, Close 1CS019A and 1CS019B (per Caution prior to step 8, 1BwCA-2.1). • Check Cnmt pressure < 15 psig. • If cnmt pressure < 15 psig, stop both CS pumps. • If CS pumps stopped, Verify/Close 1CS019A and 1CS019B, and 1CS007A and 1CS007B.
		Examiner's Note: The Crew will transition to and perform 1BwEP ES-1.3, TRANSFER TO COLD LEG RECIRCULATION, only when RWST level reaches the LO-2 setpoint. If and when that occurs, see page 30 for the evaluation.
	BOP/US	Check RWST > 46%.
	RO/US	Determine RCS pressure > 125 psig. Do NOT isolate SI Accumulators.
	CREW	Determines ECCS Flow may be reduced: • RCS Subcooling Acceptable by ICONIC or Calculation. • RCS Pressure Stable or Increasing. • PZR Level > 12% (28% Adverse).
	RO/US	Determine SI already RESET (to stop RH pumps earlier)

Comments: ____

Scenario No: 01-1		Event No. 7
Event Description:		Reactor trip resulting in 1A SG Feed line break inside containment, all MSIVs fail open, 4 faulted SGs. Manual actions required to establish and control AFW flow, and properly align containment cooling fans.
Time	Position	Applicant's Actions or Behavior
	BOP/US	Reset Cnmt Isolation: • Reset Phase B. • Check any Station Air Compressors running. • Restore IA to cnmt by opening 1IA065 and 1IA066.
	RO/US	Realign Centrifugal Charging Pumps: • Stop all but one CV pump and place in standby. • Check RCS pressure stable or increasing.
	RO/US	Terminate High Head ECCS: • Check CV pumps suction aligned to RWST. • Reset SI Recirc Sump Isolation valves 1SI8811A/1CV8110 and 1SI8811B1/CV8111. • Reset SI CV pump miniflow valves 1CV8114 and 1CV8116. • Verify OPEN 1CV8110, 1CV8111, 1Cv8114, and 1CV8116. • Close 1SI8801A and 1SI8801B.
	CREW	Establish Charging flow: • Place 1CV182 controller at 0% demand. • Open 1CV8105 and 1CV8106. • Throttle 1CV182 to maintain Seal Injection flow 8-13 gpm per RCP.
	RO/US	Control Charging flow to maintain PZR level: • Throttle 1CV121 to maintain PZR level > 12% (28% Adverse).
		Scenario is complete at this point or at the Chief examiners discretion

Comments: ____

Scenario No: 01-1		Event No. 7
Event Description:		Reactor trip resulting in 1A SG Feed line break inside containment, all MSIVs fail open, 4 faulted SGs. Manual actions required to establish and control AFW flow, and properly align containment cooling fans.
Time	Position	Applicant's Actions or Behavior
		Note: The following is to be used whenever the crew implements 1BwFR-Z.1, "Response to High Containment Pressure".
	US	Enters 1BwFR-Z.1 and directs actions: • Announces procedure transition and gets acknowledgements from RO/BOP. • Informs SM of plant status and requests GSEP evaluation.
	RO/BOP	Performs actions of 1BwFR-Z.1 as directed: • Verify Cnmt Isolation Phase A- Group 3 Cnmt Isol monitor lights Lit. • Verify Cnmt Ventilation Isolation- Group 6 Cnmt Vent Isol monitor lights Lit. • Determines CS is required (Cnmt pressure has increased to > 20 psig). • Stops all RCPs if NOT previously stopped.

Comments: ____

Scenario No: 01-1		Event No. 7
Event Description:		Reactor trip resulting in 1A SG Feed line break inside containment, all MSIVs fail open, 4 faulted SGs. Manual actions required to establish and control AFW flow, and properly align containment cooling fans.
Time	Position	Applicant's Actions or Behavior

	BOP:	Performs actions of 1BwFR-Z.1 as directed:
		• Verifies proper CS system alignment:
		  • CS suction valves open (1CS001A\ 1CS009A, or 1CS001B\ 1CS009B).
		  • CS pump header isolation valves open (1CS007A and 1CS007B).
		  • CS eductor spray additive valves open (1CS019A and 1CS019B).
		  • CS eductor inlet flow control valves open (1CS010A and 1CS010B).
		  • CS pumps running.
		  • Group 6 Phase B lights Lit.
		  • CS eductor suction flow > 15 gpm (1FI-CS013\ 1FI-CS-14).
		  • CS eductor additive flow > 5 gpm (1FI-CS015\ 1FI-CS016).
		  • Reset CS signal.
		  • Checks Spray additive tank LO-2 lights, then closes 1CS019A and 1CS019B even if NOT lit per Caution prior to Step 3, 1BwFR-Z.1 (Secondary Break only).
		  • Verify RCFCs running in Accident Mode- Group 2 RCFC Accident Mode status lights lit.
		  • Determines MS Isolation necessary and Manually actuates MSIV isolation and verifies MS B\P valves Closed. Reports all MSIVs still open.

	BOP **CT: CA-2.1—A.**	Determines all SGs are faulted and controls AF Flow: • Any SG pressure decreasing uncontrollably or completely depressurized. • Controls AFW flow to 1B, 1C, and 1D SG at 45 gpm per SG by throttling 1AF005F, G, and H; or 1AF013F, G, and H. • Attempts Control of AFW to 1A SG via 1AF005E, and 1AF013E and reports no control available. • Sets potentiometer for 1AF005E to 0%. • Dispatches operator to locally throttle 1AF005E. • Checks FW isolated to all SGs – all FW Isolation Monitor Lights Lit.
	US	Returns to step and procedure in effect: • Announces procedure transition and gets acknowledgements for RO and BOP. • Informs SM of Status.

Comments: ____

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Scenario No: 01-1		Event No. 7
Event Description:		Reactor trip resulting in 1A SG Feed line break inside containment, all MSIVs fail open, 4 faulted SGs. Manual actions required to establish and control AFW flow, and properly align containment cooling fans.
Time	Position	Applicant's Actions or Behavior
		Examiner's Note: Use the following to evaluate the performance of 1BwEP ES-1.3 TRANSFER TO COLD LEG RECIRCULATION, if and when the crew enters it.
	US	Enter and Direct actions of 1BwEP ES-1.3, Transfer to Cold Leg Recirculation: • Announce transition and get acknowledgements from RO and BOP. • Inform SM of status and to evaluate for GSEP. • Suspend performance of any BwFRs until after completing step 6 of 1BwEP ES-1.3.
	BOP	Perform actions of 1BwEP ES-1.3 as directed: • Establish CC flow to RH HX – Open 1CC9412A and 1CC9412B, ensure flow > 5000 gpm (1FI-0688/9) • Check adequate Cnmt Sump level - ≥ 8 inches (13 inches adverse) 1LI-PC006/007. • Verify/Start RH pumps running (may have been stopped earlier). • Check Cnmt Sump Isolation Valves open – 1SI8811A and 1SI8811B. • Close RH pump suction from RWST – 1SI8812A and 1SI8812B. • Check SI or CV pumps running in ECCS injection mode – SI pumps running, or 1SI8801A/B Open. (if not due to previous actions, then only CS pump suction must be swapped to Sump.)
	BOP/RO	Align SI and CV for Cold Leg Recirc: • Stop SI pumps if RCS pressure > shutoff head. • Dispatch operator to energize 1SI8813 and 1SI8806. • Verify 1A CV pump miniflow isolation valves closed – 1CV8111 and 1CV8114. • Verify 1B CV pump miniflow isolation valves closed – 1CV8110 and 1CV8116. • Close SI pump miniflow isolation valves – 1SI8814, 1SI8920, and 1SI8813. • Close RH HX discharge crosstie valves – 1RH8716A and 1RH8716B. • Open SI and CV pump suction header crosstie valves – 1SI9907A, 1SI8807B and 1SI8924. • Check RH pumps 1A and 1B running. • Open RH to CV pumps isolation valve (1CV8804A) and RH to SI pumps isolation valve (1SI8804B). • Start ECCS pumps as necessary (SI and CV)
	US	Implement BwFRs as necessary.

Comments: ______________________________

Scenario No: 01-1		Event No. 7
Event Description:		Reactor trip resulting in 1A SG Feed line break inside containment, all MSIVs fail open, 4 faulted SGs. Manual actions required to establish and control AFW flow, and properly align containment cooling fans.
Time	Position	Applicant's Actions or Behavior

	RO/BOP	Complete actions of 1BwEP ES-1.3 as directed:
		• Reset SI, Verify SI Actuated Light OUT, and AUTO SI Blocked light Lit.
		• Isolate RWST for CV and SI pumps:
		  • Check either/ both 1CV8804A and 1SI8804B open.
		  • Close SI pump suction from RWST – 1SI8806.
		  • Close RWST to CV pump suction valves – 1CV112D and 1CV112E, and dispatch operator to de-energize.
		• When RWST LO-3 lights lit:
		  • Open CS pump sump suction valves - 1CS009A and 1CS009B.
		  • Close CS pump RWST suction valves – 1CS001A and 1CS001B.
		  • Verify both CS pumps running.
		• Align CC for Post LOCA recovery:
		  • Open CC HX 0 Outlet valve – 0SX146.
		  • Open CC HX 0 Inlet valve – 1SX005.
		  • Dispatch operator to adjust 0/1SX007 valves to maintain CC HX outlet < 105 degrees F and SX pump motor amps < 191 amps.
		  • Initiate alignment of CC for Post LOCA Recovery per BwOP CC-14, POST LOCA ALIGNMENT OF THE CC SYSTEM.

	US	Return to procedure and step in effect.

Comments: ____

Simulation Facility	Braidwood	Scenario No.:	01-2	Operating Test No.: 1
Examiners:	______	Applicant:	______	SRO
	______		______	RO
	______		______	BOP

Initial Conditions: IC-22, 100% Power, Steady state, MOC.

Turnover: 1A MFP is unavailable due to breaker cubicle work. MESACs were completed for 1D SGWLC instrumentation last shift. Ramp down to 90% power in preparation for TV-GV Surveillance due next shift.

Event No.	Malf. No.	Event Type*	Event Description
Preload	FW01 ED06H RP01 RP02A and B TC03 Override: ZDI1HSTG010, NORM RF RP 34 and 35 OUT RF RP60 and 61 OUT FW44	C BOP C BOP C RO C BOP C BOP C BOP	MFP 1A fails to start/ OOS. 6.9KV Breaker 1591 fails to ABT. Reactor fails to auto Trip/ATWS Reactor Trip breakers fail to open from control room/ATWS Turbine fails to Auto Trip Turbine fails to Manually Trip. MSIVs fail to Isolate on Auto Isolation signal. 1B AFW pump fails to start.
1		R RO SRO N BOP	Lower Reactor power with boration and control rods. Ramp down turbine power from 100% to 90%.
2	RX18B, 590, 1 min ramp	I RO SRO	RCS Loop 1B Tcold RTD fails to mid-span over 1 minute.
3	RF RP38 IN FW43 (Trigger)	C BOP SRO	Inadvertent Auto start of 1A AFW pump. 1A AFW pump fails to start after C/S taken to Pull Out.
4	RX05, 0, 5 min ramp	I BOP SRO	Main steam Header Pressure Controller (1PT-507) fails low over 5 minutes.
5	CV08, ~~600~~ 0	C RO SRO	Letdown Pressure Control valve (1PT-131) fails closed.
6	ED05D RP09A	M BOP RO SRO	SAT feed breaker to bus 159 trips opens, no ABT. Loss of RCS flow (Loop 1D) ATWS and turbine fails to trip. Inadvertent FWI. Loss of Heat Sink.
7	RD06 RF ED073B OPEN (Trigger)	C RO C RO SRO	Control rods fail to move in AUTO. (MANUAL Control available) Emergency boration valve stuck closed.
8	RF RP34 AND 35 OUT RP 60 AND 61 OUT	C RO BOP	MSIV'S fail to Auto Isolate.

*(N)ormal, (R)eactivity (I)nstrument, (C)omponent, (M)ajor Transient

SCENARIO 01-2 OVERVIEW

The scenario begins with the plant at 100% power and a ramp down to 90% in preparation for the TV-GV surveillance due next shift. The turnover includes information that 1A MFP is unavailable due to breaker cubicle work, and MESACs were completed for 1D SGWLC instrumentation on the previous shift.

After clearly observable plant response to the requested reactivity change, the Tcold RTD on Loop 1B will drift high causing inward rod motion. The RO will diagnose the instrument failure and place rod control in manual. The power change may be suspended. The SRO will enter 1BwOA INST-2 Attachment A, "OPERATION WITH A FAILED INSTRUMENT CHANNEL – RCS NARROW RANGE RTD CHANNEL FAILURE", and direct crew actions to defeat the failed channel, restore Tave and automatic rod control, investigate Tech Specs, and trip bistables. LCO 3.3.1 condition E will apply. Maintenance will investigate as requested. When the recovery is complete, the load ramp will recommence if previously suspended.

After the bistables are tripped for the failed RTD, an inadvertent automatic start of the 1A AFW pump will occur due to a slave relay actuation. The addition of colder feedwater to the SGs will cause Tave to decrease and outward rod motion to occur. The BOP will respond by referencing the annunciator response procedures. When the control switch for the 1A AFW pump is placed in PULL OUT to stop the unwanted addition of AFW, the pump will no longer start for the remainder of the scenario. (This failure to start may not be discovered until the major transient.) The SRO will investigate Tech Specs for AFW. LCO 3.7.5 will apply. Maintenance will investigate as requested.

Shortly after the inadvertent start of the 1A AFW pump, the main steam header pressure controller will slowly fail low. This will cause the main feed pumps to slow down, the feed regulating valves to open, and a decrease in all SG water levels. The BOP will diagnose the failure, place main feed pump speed control in manual and increase feed pump speed to restore SG levels and main feed header pressure to the program value. The steam dump controller will no longer respond correctly in the steam pressure mode of operations, but this is inconsequential at power.

After SG levels are stable, the letdown pressure control valve will fail closed causing the letdown relief valve to lift to the PRT. There will be no manual control available and the indication will be that the valve is trying to control letdown pressure at 600 psig. The RO will diagnose this from high letdown pressure and manually isolate letdown. The pressure control valve will be locally isolated and bypassed and letdown flow restored. Excess letdown may be placed on line.

After letdown restoration, breaker 1592 trips causing a loss of 6.9KV Bus 159. No ABT to the UAT will occur, resulting in a loss of the 1D RCP. The Reactor Protection System will sense the loss of RCS flow and generate a reactor trip (OPDT) signal. The Reactor will fail to trip (ATWS), requiring manually drive rods emergency boration because rods will fail to move. 38 gpm [illegible] The Turbine will fail to trip, necessitating a manual runback of the turbine. The voltage transient will cause feedwater to isolate. The delay in getting the turbine tripped and the loss of feed will most likely result in the generation of Safety Injection and MSIV Isolation signals. The MSIVs will NOT automatically close, but can be manually closed. The SRO will implement 1BwFR S.1, "RESPONSE TO NUCLEAR POWER GENERATION/ ATWS", and the crew will perform Immediate Actions. The 1A AFW pump will NOT start if taken out of PULL OUT. The 1B AFW pump will fail to start. The emergency boration valve will be stuck closed, necessitating an alternate emergency boration source and flow path.

Comments: ____

The reactor will trip when the steam dumps are taken to off.

A transition from the ATWS procedure to 1BwFR H.1, "LOSS OF SECONDARY HEAT SINK," will be made if the SRO has directed the STA to monitor Critical Safety Function Status Trees and narrow range steam generator levels are all less than 10%. Otherwise, the SRO will transition to 1BwEP-0, "REACTOR TRIP OR SAFETY INJECTION", and diagnose the need to transition the 1BwFR H.1 when AFW flow is unable to be verified.

Upon entering 1BwFR H.1, the loss of SG water levels will require the initiation of Bleed and Feed. The SRO will direct tripping of all RCPs and the initiation of Bleed and Feed. After Bleed and Feed is initiated, the SRO will direct attempts to restore feed flow. Main feed and AFW are not available. When Condensate flow is established, the scenario ends.

Critical Tasks

FR-S.1—A:	Isolate main steam from the main turbine before exceeding 3107 psig RCS pressure.
FR-S.1—C	Insert negative reactivity into the core by inserting control rods and/or emergency boration.
FR-H.1—B	Initiate RCS Bleed and Feed before PZR PORVS remain open due to loss of secondary heat sink.

Comments: ______________________________

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SIMULATOR OPERATOR NOTES

Simulator Setup:
Init IC-22, 100% power, MOC, Xenon equilibrium, steady state.
Align switches, perform "Ready for Training" checklist.
Insert PRELOAD Events:
Take 1A MFP CS to Pull Out and hang tag. IMF FW01 (1A MFP fails to start)
IMF ED06H 6.9 Breaker 1591 fails to Auto Bus Transfer.
IMF RP01 Reactor fails to Auto Trip.
IMF RO02A and RP02B Reactor Trip breakers fail to open from Control Room/ATWS.
IMF TC03 Turbine fails to auto trip.
IMF FW 44 1B AFW pump fails to start.
IOR ZDI1HSTG010 NORM Turbine fails to manually trip.
MRF RP34 and RP35 OUT MSIVs fail to isolate on auto isolation signal.
MRF RP60 and RP61 OUT MSIVs fail to isolate on auto isolation signal.

Event 1: Ramp down to 90% (1134Mwe).
As SM acknowledge ramp.
As Elec Ops acknowledge ramp.

Event 2 RCS Loop 1B Tcold RTD fails to mid span (590 degrees F), over 1 minute.
SDG: RX2
Malf: RX18B, 590, 1 minute ramp.
Initiate event after clearly observing reactivity change/response of plant from requested power ramp or upon lead examiner cue.
Role play as U-2 admin and/or extra NSO to accomplish bistable tripping. Acknowledge all info passed to the SM, WEC, and maintenance.

SDG: RX4 and RX2

Cabinet door #2 Open				RF	RX21	OPEN
OPDT Trip	TB421G	C2-124	BS-1	RF	RX018	TRIP
OPDT Runback	TB421H	C2-124	BS-2	RF	RX138	TRIP
OTDT Trip	TB421C	C2-124	BS-3	RF	RX017	TRIP
OTDT Runback	TB421D	C2-124	BS-4	RF	RX137	TRIP
Low Tave	TB422G	C2-121	BS-2	RF	RX020	TRIP
Lo-Lo Tave	TB422D	C2-121	BS-1	RF	RX019	TRIP
Cabinet door #2 Close				RF	RX21	CLOSE

Comments: ______________________________________

Event 3 Inadvertent start of 1A AFW pump.
SDG: RP14
MRF RP38 IN
Initiate inadvertent start of 1A AFW pump after tech specs are investigated for the failed RTD in event 2, or at the lead examiners cue.

If dispatched to locally turn off the aux oil pump, use OVERRIDE, to override the 1A AFW pump Aux Lube Oil pump light OFF. IOR ZLO1AF01PAA OFF.
INSERT Malf FW43 to prevent any further starts of the 1A AFW pump. Use Trigger: When ZDI1AF01PA(5) == 1, then IMF FW43.
If sent to locally investigate, the pump looks normal, and there are no abnormal indications at the breaker. If sent to the slave relay, report it is IN. (K 633)
Acknowledge all info passed to the SM, WEC, and maintenance.

Event 4 Main Steam Header Pressure Controller (1PT-507) fail low over 5 minutes.
SDG: RX22
Malf: RX05, 0, 5 minutes
Initiate malfunction after tech specs are investigated for the inoperable 1A AFW pump, or at the lead examiners cue.
Acknowledge all info passed to the SM, WEC, and maintenance.

Event 5 Letdown pressure control valve (1PT-131) fails closed.
SDG: CV2
Malf: CV08, ~~600~~ 0. As valve fails, in order to simulate no auto control, also use RF CV01 CLOSE to close the Isolation valve (1CV8408A).
Initiate malfunction after the feed flows and feed pump speeds are stabilized in manual, or at the lead examiners cue.
Acknowledge all info passed to the SM, WEC, and maintenance.
If dispatched to locally isolate and bypass the valve use the following:
SDG: CV2
Isolate: RF CV01 CLOSE CV8408A (and CV8408B is not modelled).
Bypass: RFCV02 OPEN CV8409

Events 6 and 7 are run together.

Event 6 Loss of Bus 159 and Spurious feedwater isolation.
SDG: ED2A
Malf: ED05D
Malf: RP09A

Comments:

Initiate Major Accident sequence after the letdown pressure control valve is bypassed, or at the lead examiners cue.
Set up trigger to cause the FWI when the 1592 breaker fails:
When YP:MED05D==1, then IMF RP09A.

Event 7 Control Rods fail to move. Auto Rod speed RD09 8
Ensure the trigger to activate the rods fail to move malfunction occurs at the time of the loss of bus 159.
When YP:MED05D ==1, then IMF RD06.
Ensure the trigger to de-energize 1CV8104 (Bus 132X5:B1) occurs when bus 159 is lost.
When YP:MED05D == 1, then MRF ED073B OPEN

Acknowledge the call to locally trip the reactor, but do NOT trip the reactor until the steam dumps are taken to OFF.

If asked to locally trip the turbine at the pedestal, wait until after the steam dumps are taken to OFF, then use RF TC03 TRIP on SDG TC1.

Trigger: When ZDI1HSBYPA(1) == 1, then DMF RP01.
Trigger: When ZDI1HSBYPB(1) == 1, the DMF RP02A and RP02B.

Acknowledge the call for the STA to monitor Status Trees. Pay particular attention to Heat Sink (after ATWS). The intent is to get to H.1 and Bleed and Feed..

Acknowledge all info passed to the SM, WEC, and maintenance.

If directed to remove the FWI aux relay fuses, use the following:

RF	FW150	REMOVE
RF	FW151	REMOVE
RF	RP78	REMOVE
RF	RP79	REMOVE

Report fuses removed when complete.

Comments: ______________________________

Scenario No: 01-2		Event No. 1
Event Description:		Ramp down Turbine and reactor power to 90% (1120 Mwe).
Time	**Position**	**Applicant's Actions or Behavior**
	CUE	Turnover information identifies upcoming TV-GV Surveillance requiring power reduction.
	US	Implement actions of 1BwGP 100-4, Rev. 15 step 1, Power Descension.
	US	Direct load reduction to 1120 Mwe at desired rate (5 MW/minute). • Initiate Load Swing Instruction sheet, 1BwGP 100-4T2, and Boration Dilution Boundary Calculation (~100 gals). o Contact Chemistry and HP for load change. • Inform SM of plant status, and Elec Ops of ramp.
	CREW	Review applicable Precautions, Limitations and Actions.

Comments: ____

Scenario No: 01-2		Event No. 1
Event Description:		Ramp down Turbine and reactor power to 90% (1134 Mwe).
Time	Position	Applicant's Actions or Behavior
	RO	Verify rod position and boron concentration. Initiate boration, if required. (BwOP CV-6, Rev. 13.) • Determine required boric acid volume by: o Effects of previously performed borations. o Braidwood Boration Dilution Tables. • Determine required boric acid flow rate. • Set 1FK-110 BA Flow Cont to desired boration rate. • Set 1FY-0110 BA BlenderPreset Counter to desired volume. • Place MAKE-UP MODE CONT SWITCH to STOP position. • Set MU MODE SELECT to BOR position. • Place MAKE-UP MODE CONT Switch to START. • Verify proper operation of valves and BA transfer pump (CV110B open, BA pump is running, CV110A throttles opens, BA flow on recorder. OR Batch addition: • Open CV110B. • Open CV110A. • Start BA Transfer pump. • When desired amount of BA added, stop BA Transfer pump. • Close CV110A. o Flush BA line. • Close CV110B.
	BOP	Initiate turbine load reduction: • Depress LOAD RATE MW/MIN. • Enter desired value for rate – 5MW/min. • Depress REF. • Enter power level 1120 MW. • When ready to begin, depress GO. • Verify load decreases.

Comments: ____

Scenario No: 01-2		Event No. 1
Event Description:		Ramp down Turbine and reactor power to 90% (1134 Mwe).
Time	Position	Applicant's Actions or Behavior
	RO	Monitor power decrease: • Monitor reactor power, Tave, ΔI. • Verify rods move in AUTO to maintain Tave within ± 1 degree F of Tref. If borating: • Monitor VCT level. • Verify RCS boron concentration increasing. • Monitor BA Blender counter. • Verify boration auto stops at preset value. o Flush the BA line if desired. • Return Reactor Makeup System to blended flow at current blended flow. • If required to equalize boron concentration between the PZR and the loops, open PZR sprays by placing B/U HTR GRPS A/B/D Contactor Control Switch to the on position
		Note: Following clearly observable plant response from the reactivity changes, Event 2 is entered.

Comments: ____

Scenario No: 01-2		Event No. 2
Event Description:		RCS Loop 1B Tcold RTD fails to mid-span over 1 minute.
Time	**Position**	**Applicant's Actions or Behavior**
	CUE	Annunciators: 1-14-B5 LOOP 1B DT DEV LOW 1-14-A/C/D3 LOOP 1A/C/D TAVE DEV LOW 1-14-D1 TAVE CONT DEV HIGH 1-14-E2 AUCT TAVE HIGH Indications: Rod Motion Inward Loop 1B Tave Meter higher than normal.
	RO/US	Identify/report failed RTD input/Tave Channel • Diagnose Loop 1B NR Tcold RTD Failure.
	US	Implement 1BwOA INST-2, "OPERATION WITH A FAILED CHANNEL", ATTACHMENT A, "RCS NARROW RANGE RTD CHANNEL FAILURE", and direct actions. • Get acknowledgements of procedure entry from RO and BOP. • Inform SM of status and to evaluate for GSEP. • Direct WEC to write AR, CR, and get maintenance involved.

	RO/US	Perform actions as directed:
		• Place Rod Bank select Switch to Manual
		• Manually defeat failed RTD channel:
		• Select Loop B on Tave Defeat switch
		• Select Loop B on DT defeat switch
		• Ensure Loop B is NOT selected on DT recorder
		• Check Tave stable and within 1 degree F of Tref.
		  • If NOT,
		    o Adjust Rods.
		    o Adjust turbine load.
		    o Adjust Boron.
		
		• When Tave and Tref stable and within 1 degree F, place Rod control in Automatic.
		
		• Check PZR Level normal and stable
		• If NOT, manually restore to program level.

Comments: ____

Scenario No: 01-2		Event No. 2
Event Description:		RCS Loop 1B Tcold RTD fails to mid-span over 1 minute.
Time	**Position**	**Applicant's Actions or Behavior**
	RO/BOP	Coordinate tripping of bistables: Expected Alarms: • OPDT Trip TB431G C3-124 BS-1 14-A-1 • OPDT Runback TB431H C3-124 BS-2 10-A-5 • OTDT Trip TB431C C3-124 BS-3 14-B-1 • OTDT Runback TB431D C3-124 BS-4 10-C-5 • LOW TAVE TB432G C3-121 BS-2 14-B-3 • LO-LO TAVE TB432D C3-121 BS-1 14-C-1
	US/RO	Check P-12 Status:(45 B/P): o Tave > 550, P-12 NOT LIT. o Tave < 550, P-12 LIT.
	US	Refer to Tech Specs: • 3.3.1 (6 hrs to trip bistables) FU 6 and 7, condition E. • 3.3.2 N/A, meets required # of operable channels.
	BOP	Assist RO/US as directed: o Adjust turbine load or ramp o Monitor FW and Reactor panels as directed. o Coordinate tripping of Bistables. o Review BwARs.
		Note: Following Tech Spec determination, initiate Event 3.

Comments: ____

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Scenario No: 01-2		Event No. 3
Event Description:		Inadvertent Automatic Start of 1A AFW pump.
Time	**Position**	**Applicant's Actions or Behavior**
	CUE:	Annunciators: 1-3-B6 AF PUMP AUTO START 1-3-B7 AF PUMP DISCH FLOW HIGH Indications: Run/Flow indication from 1A AFW pump. Decreasing Tave, and Feed Reg Valve Position Demand. Increasing Reactor Power.
	BOP/US	Diagnose an automatic spurious start of 1A AFW pump and announce/report to crew.
	BOP	Refer to BwARs for actions: 1-3-B6 AF PUMP AUTO START Rev. 7E1.
	US	Direct BOP to shutdown 1A AFW pump.
	BOP	Shutdown 1A AFW pump: o Attempt Shutdown by taking control switch to Trip. • Take control switch to PULL OUT.
	US	Investigate cause of auto start: • Dispatch NSO to check Slave relay cabinet. • Dispatch operator to locally check pump and breaker. • Declare 1A AFW pump inoperable and apply Tech Spec 3.7.5. • Report status to SM, and direct WEC to write AR, CR, and get maintenance involved.
	RO	Assist as directed by US/RO: • Monitor Reactor Power and primary parameters. • Monitor SG levels. • Refer to BwARs.
		NOTE: After Tech Specs are investigated, initiate EVENT 4.

Comments: ____

Scenario No: 01-2		Event No. 4
Event Description:		Main Steam Header Pressure Controller (1PT-507) Fails low over 5 minutes.
Time	Position	Applicant's Actions or Behavior
	CUE	Annunciators: 1-18-B7 MSR SHELL DRAIN TANK LEVEL HIGH LOW 1-18-A7 MSR SHELL DRAIN TANK EMER DRAIN VALVE OPEN 1-15-A/B/C/D4 SG 1A/B/C/D FLOW MISMATCH FW FLOW LOW 1-15-A/B/C/D9 SG 1A/B/C/D LEVEL DEVIATION HIGH LOW Indications: Feed flow indication decreasing Feed Pumps Speed Decreasing SG levels decreasing Feed Reg Valves Position Demand Increasing 1PI-507 Decreasing
	BOP/US	Diagnose/Report decreasing feed pump speed and SG levels as a result of 1PT-507 failing low.
	RO	Monitor Reactor power and primary parameters. Refer to BwARs as directed by US. Assist BOP as directed/necessary.
	US	Direct actions stabilize the plant and restore normal feedwater conditions: • Place Master feed pump speed control in Manual and Increase feed pumps speed to increase feed flow. • Direct flagging of Master Feed pump speed controller, 1PI-507, and Steam Dumps Steam Pressure. • Review effect of failure with crew with regard to Steam Dumps. • Inform SM of plant status, and direct WEC to write AR, CR, and get maintenance involved.
		• ~~[illegible]~~ Acknowledge DNB Tech Spec if Pzr Press < 2209. (3.2.5)
	BOP	Perform actions as directed by US: • Place Master feed pump speed control in Manual and Increase feed pumps speed to increase feed flow. • Control feed flow to recover SG levels in a controlled manner without over cooling the RCS. • Stabilize feed flow/ pump speed to maintain SG levels at ~60%.

Comments: ____

Scenario No: 01-2		Event No. 4
Event Description:		Main Steam Header Pressure Controller (1PT-507) Fails low over 5 minutes.
Time	Position	Applicant's Actions or Behavior
		NOTE: After crew stabilizes SG levels, initiate event 5.

Comments: ____

Scenario No: 01-2	Event No. 5
Event Description:	Letdown Pressure Control Valve 1PT-131 fails closed.

Time	Position	Applicant's Actions or Behavior
	CUE	Annunciators: 8-B-5 LTDWN HX OUTLT PRESS HIGH Indicators: 1PI-131 @ ~~600~~ 80 psig. Letdown flow cycling Letdown Pressure cycling
	RO/US	Diagnose failure of 1CV-131 closed, and report/announce to crew. Refer to BwARs.
	US	Direct actions of RO/BOP. Inform SM of plant status. Direct WEC to generate AR, CR, and get maintenance involved.
	RO/BOP	Perform actions as directed by US: • Attempt manual control to open 1CV-131, report no success. • Isolate Letdown – Close 1CV8149A,B,C; Close 1CV459 and/or 1CV460. • Reduce Charging flow- throttle 1CV182 to maintain 8-13 gpm seal injection per RCP. • Isolate Charging – Close 1CV8105 and/or 1CV8106. • Dispatch operator to locally check 1CV-131. • Determine 1CV-131 must be isolated, and direct isolation –close 1CV8408A and/or 1CV8408B.
		Note: US may direct actions to place excess letdown on line (see next page).

	RO/BOP	Bypass 1CV-131 and re-establish letdown:
		• Dispatch operator to throttle open 1CV8409 as necessary during process to re-establish letdown per BwOP CV-17:
		    • Re-establish charging flow at ~100 gpm – Open 1CV8105 and 1CV8106.
		    • Throttle open 1CC130 to 60% in manual.
		    • Direct local operator to open 1CV8409 to 40%.
		    • Open 1CV459 and 1CV460.
		    • Open 1CV8149A/B/C, as necessary to establish desired letdown flow.
		    • Restore PZR level to program value.

Comments: ______________________________

Scenario No: 01-2		Event No. 5
Event Description:		Letdown Pressure Control Valve 1PT-131 fails closed.
Time	Position	Applicant's Actions or Behavior
	RO/BOP	Monitor reactor power and primary parameters: • Seal injection flow. • PZR Level. • VCT level.
	RO/BOP	Perform actions as directed by US to place excess letdown online per BwOP CV-15 Excess Letdown Operations: • Locate and Open BwOP CV-15. • Review Precautions, Prerequisites, Limitations and Actions. • Verify Rx Power is at least 0.1% below applicable limits. • Verify/OPEN 1CV800 and 1CV8112. • OPEN 1CC9437A and 1CC9437B. • Verify/CLOSE HCV-1CV123. • Place 1CV8143 in position directed by US (either VCT or RCDT). o Determine seal return does not need to be changed. • OPEN 1RC8037A/B/C/D. • OPEN 1CV8153A/B. • SLOWLY OPEN HCV-1CV123. • Ensure excess letdown temperature is < 165 degrees F on 1TI-122A. • Report excess letdown on line when complete.
		Note: After letdown has been re-established, initiate event 6 (and 7)

Comments: ____

Scenario No: 01-2		Event No. 6 and 7
Event Description:		Loss of 6.9 KV Bus 159 no ABT resulting in a partial Loss of Flow ATWS. Turbine fails to trip – Loss of Heat Sink. During ATWS Control rods fail to move, and 1 emergency boration flow path is unavailable.
Time	**Position**	**Applicant's Actions or Behavior**
	CUE	Annunciators: 20-A-6 BUS 159 Fd BRKR 1592 TRIP 20-D-6 BUS 159 VOLT LOW 13-A-2 RCP BUS UNDERVOLTAGE RX TRIP ALERT 13-D-3 RCP 1D BRKR OPEN OR LOW FLOW ALERT 13-E-3 RCP TRIP 11-A-4 OPDT RX TRIP 11-C-5 RCP LOW FLOW ABOVE P8 RX TRIP No voltage on Bus 159: Loop 1D RCS flow coasting down Inward rod motion demanded, but not occurring fast enough Open light indication for 1CV8104 NOT lit. No indicated AFW flow FWI monitor lights lit.
	CREW	Diagnoses loss of Bus 159, 1D RCP, and RED First Out dictating need for Reactor Trip, but failure of Automatic Trip to Occur. RO attempts manual reactor trip from both switches (1PM05J and 1PM06J) and reports no reactor trip.
	US	Announces ATWS, and enters and directs actions of 1BwFR-S.1, ATWS: • Gets acknowledgement from RO and BOP. • Informs SM, requests GSEP. • Requests STA to monitor Status Trees.
		Examiner's Note: STA will be role played by an instructor. A Red path will be identified on Subcritcality (as long as it exists) and on Heat Sink when it exists. Appropriate procedure transitions will be identified by the STA on the Status Tree log.
	RO	Performs immediate actions of 1BwFR-S.1 ATWS: o Manually attempts reactor trip from 1PM05J and 1PM06J RX Trip Switches (optional only if previously tried). • Determines rods should be auto inserting but are NOT moving fast enough, and reports to US. • Attempts manual control rod insertion, and reports no success to US. (7-8 spm) o Dispatches operator to locally trip Unit 1 Reactor Trip Breakers.

Comments: ____

Scenario No: 01-2		Event No. 6 and 7
Event Description:		Loss of 6.9 KV Bus 159 no ABT resulting in a partial Loss of Flow ATWS. Turbine fails to trip – Loss of Heat Sink. During ATWS Control rods fail to move, and 1 emergency boration flow path is unavailable.
Time	Position	Applicant's Actions or Behavior

	RO/BOP
	
	CT FR-S.1—C.
		Initiate Emergency Boration:
		• Checks at least one CV pump running.
		• Attempts to open 1CV8104.
		o Reports 1CV8104 won't open.
		• Aligns either of the following boration flow paths:
		  • Opens 1CV112D and/or 1CV112E.
		  • Closes 1CV112B and/or 1CV112C.
		  • Maximizes Charging flow.
		  • Verifies letdown established.
		
		  OR
		
		  • Open 1CV110A and 1CV110B.
		  • Starts Boric Acid Transfer Pump.
		  • Verify Charging flow > 30 gpm.
		
		• Check PZR pressure < 2335, if NOT, then VERIFIES PZR PORVs and Isolation valves are OPEN, VERIFIES PZR PORVs close at 2135 psig.

	BOP
	
	CT FR-S.1—A.
		Performs immediate actions of 1BwFR-S.1 ATWS:
		• Determine Turbine did NOT auto trip, attempts Manual Turbine Trip, and determine turbine did NOT manually Trip.
		• Isolate MS from the main turbine by:
		  • Run back the Turbine at the Maximum rate:
		  • Press Turbine Manual.
		  • Press Fast Action Lower.
		
		  OR
		
		  • Closing All MSIVs and bypasses (by actuating MSIV Isolation and using individual MSIV switches on 1PM06J).
		o Places EH pumps in PULL OUT if any MSIV does not close.

Comments: ____

Scenario No: 01-2		Event No. 6 and 7
Event Description:		Loss of 6.9 KV Bus 159 no ABT resulting in a partial Loss of Flow ATWS. Turbine fails to trip – Loss of Heat Sink. During ATWS Control rods fail to move, and 1 emergency boration flow path is unavailable.
Time	Position	Applicant's Actions or Behavior

	BOP	Completes Immediate Actions of 1BwFR-S.1 ATWS:
		• Determine AF pumps not running:
		  • Attempts auto start of 1A AFW pump by taking control switch out of PULL OUT.
		  • Attempts manual start of 1A and 1B AFW pumps, reports no success to US.
		  • Dispatches operator to locally start 1B AFW pump per BwOP AF-7.
		  o Dispatches operators to locally check 1A AFW pump and breakers.

	BOP/RO	Verify Containment Ventilation Isolation: • Group 6 Cnmt Vent Isol Monitor lights LIT.
	CREW	Determine if MSIV Isolation signal is Active, but MSIVs did NOT Auto Close. Close MSIVs if signal present. Determines SI Actuation Signal has occurred.
	RO	Determines Reactor is NOT Shutdown: • Power range channels NOT < 5%. • Intermediate range channels NOT negative Startup rate.
		Note: Reactor will trip when Dumps are taken to OFF.
	BOP	Isolate Steam Dumps: • Place steam dump BYPASS/INTERLOCK switches to OFF RESET.
	RO	Reports Reactor Tripped.
	BOP	Dispatches operator to: • Locally actuate turbine Trip lever at pedestal. • Open both EH pump breakers by depressing the switch gear manual trip buttons.

Comments: ____

Scenario No: 01-2		Event No. 6 and 7
Event Description:		Loss of 6.9 KV Bus 159 no ABT resulting in a partial Loss of Flow ATWS. Turbine fails to trip – Loss of Heat Sink. During ATWS Control rods fail to move, and 1 emergency boration flow path is unavailable.
Time	Position	Applicant's Actions or Behavior
	BOP	Reports Heat Sink Status: • SG Narrow Range Levels all less than 10 % (31% adverse). • No AFW is available. • SG Blowdown valves 1SD002A-H all Closed.
	RO	Checks dilution paths Isolated: • 1CV11A and 1CV111B CLOSED. • BTRS mode selector switch in OFF. • Dispatches operators to locally verify dilution paths isolated per step 10.c. of 1BwFR-S.1.
	RO/BOP	Determine NO reactivity insertion from uncontrolled cooldown: • RCS temperature NOT decreasing in an uncontrolled manner. • No SG pressure decreasing in an uncontrolled manner.
	US/RO	Determines CETC < 1200 degrees F.
	US/RO	Determines Reactor Subcritical: • PR channels < 5%. • IR channels negative SUR.
		Note: Crew may transition to 1BwEP-0, Reactor Trip or SI, from the ATWS procedure until the STA provides the report of a Red path on Heat Sink. (See Pg 22)
	US	Returns to procedure and step in effect (1BwEP-0, Reactor Trip or SI). Announces procedure transition and gets acknowledgement from RO and BOP. Informs SM of plant Status. Requests GSEP evaluation from SM. Directs actions of 1BwEP-0, Reactor Trip or SI.

	RO	Performs Immediate Actions of 1BwEP-0, Reactor Trip or SI:
		• Verify Reactor Trip:
		  • All Rod Bottom Lights Lit.
		  • Reactor Trip and Bypass Breakers Open.
		  • Neutron Flux Decreasing.
		
		• Determines SI is Required/Actuated, and Manually Actuates SI.

Comments: ____

Scenario No: 01-2		Event No. 6 and 7
Event Description:		Loss of 6.9 KV Bus 159 no ABT resulting in a partial Loss of Flow ATWS. Turbine fails to trip – Loss of Heat Sink. During ATWS Control rods fail to move, and 1 emergency boration flow path is unavailable.
Time	Position	Applicant's Actions or Behavior

	BOP	Performs Immediate Actions of 1BwEP-0, Reactor Trip or SI:
		• Verify Turbine Trip:
		  • Verify all Turbine Throttle Valves are Closed.
		  • Verify all Turbine Governor Valves are Closed.
		
		• Verify Power to 4KV ESF Buses:
		  • Buses 141 and 142 Bus Alive Lights both LIT.

	BOP	Performs Actions of 1BwEP-0 as directed:
		• Verify FW Isolation:
		  • FW Pumps Tripped.
		  • FW Isolation Monitor Lights LIT.
		  • FW Pump Discharge Valves (1FW002A, B, C) Closed.

	RO	Performs Actions of 1BwEP-0 as directed:
		• Verify ECCS Pumps running:
		  • Both CV pumps.
		  • Both RH pumps.
		  • Both SI pumps.

Comments: ____

Scenario No: 01-2		Event No. 6 and 7
Event Description:		Loss of 6.9 KV Bus 159 no ABT resulting in a partial Loss of Flow ATWS. Turbine fails to trip – Loss of Heat Sink. During ATWS Control rods fail to move, and 1 emergency boration flow path is unavailable.
Time	Position	Applicant's Actions or Behavior

	BOP	Performs actions of 1BwEP-0 as directed:
		• Verify RCFCs running in Accident Mode:
		  • Group 2 RCFC Accident Mode status lights lit.
		
		• Verify Cnmt Isolation Phase A:
		  • Group 3 Cnmt Isol monitor lights lit.
		
		• Verify Cnmt Ventilation Isolation:
		  • Group 6 Cnmt Vent Isol monitor lights lit.
		
		• Verify AF system:
		  • Reports Neither AFW pump is running, operators have been dispatched.
		  • 1AF013A through H all Open
		  • 1AF005A through H all Throttled.
		
		• Verify 1A and 1B CC pumps are running.
		• Verify 1A and 1B SX pumps are running.
		o Verify All MSIVs were manually closed, all MSIV Bypass valves are closed.
		• Reports Containment Pressure has not exceeded 20 psig and CS is not required.
		• Reports No AFW flow is available and all SG narrow range levels are < 10% (31% adverse).

	US	Transitions to 1BwFR H.1, Loss of Secondary Heat Sink, if the STA has been stationed and is monitoring the Status Trees; or Transitions to 1BwFR H.1, Loss of Secondary Heat Sink, from 1BwEP-0, due to No AFW flow and low inventory levels in all SGs. Announces procedure transition and gets acknowledgements from RO and BOP. Informs SM of plant Status. Requests GSEP evaluation from SM. Directs actions of 1BwFR-H.1, Loss of Secondary Heat Sink.
		Note: Upon entry into 1BwFR-H.1, the Operator Action Summary page item for Bleed and Feed Initiation becomes effective. The Crew may immediately go to step 13 of 1BwFR-H.1 when the criteria are met. Step 3 of 1BwFR-H.1 will also direct the Crew to step 13.

Comments: ______________________________

Scenario No: 01-2		Event No. 6 and 7
Event Description:		Loss of 6.9 KV Bus 159 no ABT resulting in a partial Loss of Flow ATWS. Turbine fails to trip – Loss of Heat Sink. During ATWS Control rods fail to move, and 1 emergency boration flow path is unavailable.
Time	Position	Applicant's Actions or Behavior
	US/RO	Determines Secondary Heat Sink is required: • RCS Pressure > any Non faulted SG pressure. • RCS Temperature > 350 degrees F.
	RO	Reports at least one CV pump is running.
	RO/BOP	Reports plant conditions require Bleed and Feed Initiation: o Wide Range Level in any 3 SGs < 27% (43% Adverse) o PZR Pressure > 2335 due to Loss of Heat Sink.
	US	Announces Bleed and Feed required and goes to Step 13 of 1BwFR-H.1. • Get acknowledgements from RO and BOP. • Brief crew on necessity to establish RCS heat removal by Bleed and Feed quickly.
	RO **CT** **FH-** **H.1—B.**	Performs actions of 1BwFR-H.1 as directed to establish RCS Bleed and Feed: • Stops all RCPs • Actuates SI. • Checks at least 1 CV or SI pump running. • Checks Group 2 Cold Leg Injection monitor lights lit. (except AFW pumps) • Verify PZR PORV Isolation Valves (1RY8000A and 1RY8000B) energized. • Verify PZR PORV Isolation Valves (1RY8000A and 1RY8000B) Open. • Opens PZR PORVs (1RY455A and 1RY456). • Verify Both PORVs and Isolation valves Open.
	US	Directs the performance of ESF Actuation Verifications of 1BwEP-0 as time permits (or assigns BOP to perform them as time permits.)

Comments: ______________________________

Scenario No: 01-2		Event No. 6 and 7
Event Description:		Loss of 6.9 KV Bus 159 no ABT resulting in a partial Loss of Flow ATWS. Turbine fails to trip – Loss of Heat Sink. During ATWS Control rods fail to move, and 1 emergency boration flow path is unavailable.
Time	Position	Applicant's Actions or Behavior
	RO/BOP	Perform the ESF Actuation Verifications not previously performed (as time permits): o Verify Power to 4KV ESF buses. o Verify ECCS pumps running. o Verify Cnmt Isolations Phase A and Cnmt Vent. o Verify RCFCs running in Accident Mode. o Verify CC and SX pumps running. o Check MSIVs and Bypasses Closed. o Check CS Actuated and Phase B Isolation if Cnmt Pressure exceeds 20 psig

	RO/BOP	Perform Actions of 1BwFR-H.1 as directed:
		• Reset SI:
		  • Depress Both SI Reset Pushbuttons.
		  • Verify SI Actuated Permissive Light NOT LIT.
		  • Verify AUTO SI Blocked Permissive Light LIT.
		
		• Reset Cnmt Isolation:
		  • Reset Cnmt Phase A.
		  • Reset Cnmt Phase B (if necessary).
		  • Check Any Station Air Compressor running.
		  • Restore Instrument Air to Cnmt by Opening 1IA065 and 1IA066.
		
		• Maintain RCS heat Removal:
		  • Maintain ECCS flow.
		  • Maintain Both Pzr PORVs Open.
		
		• Determines IF CS is not running. (Add actions)
		
		• Verify Cold Leg Recirculation capability:
		  • Both RH pumps running.
		  • Both Cnmt Sump Isolation Valves (1SI8811A and 1SI8811B) energized.

Comments: ____

Scenario No: 01-2		Event No. 6 and 7
Event Description:		Loss of 6.9 KV Bus 159 no ABT resulting in a partial Loss of Flow ATWS. Turbine fails to trip – Loss of Heat Sink. During ATWS Control rods fail to move, and 1 emergency boration flow path is unavailable.
Time	Position	Applicant's Actions or Behavior
	RO/BOP	Try to establish AF to at least one SG: • 1SD002A-H Closed. • 1SD005A-D Closed.

	US	Prior to initiating feed flow, reviews Feed Flow Limitations (Attachment B of 1BwFR-H.1):
		• Determines bleed and feed has been initiated and is either
		  • Effective in preventing further rise in CETCs in whicjh case the limitations are:
		    • Feeds any Non Dry SG with Non voided feedlines at desired rate.
		    • If all SGs are dry, feeds one SG at 40-80 gpm for 15 minutes, then after 15 minutes does NOT exceed 100 gpm feed rate. When SG WR level >10% (27% Adverse) feed rate may be increased as desired.
		
		OR
		
		  • Ineffective (CETCs are still rising) in which case the limitations are:
		    • Feeds any non-dry S/Gs at maximum rate until CETCs decrease. Then feeds at desired rate.
		    • If all S/Gs are dry, feeds one S/G at maximum rate until CETCs decrease then feeds restored S/G at desired rate; checks for faults or ruptures.

	RO/BOP	Performs actions as directed: • Check AF PUMP SX SUCT VLVS ARMED alarm (1-3-E7) NOT LIT. • Checks AF test valves (1AF004A and 1AF004B) open. • Checks 1AF013A-H open for selected SG(s). • Checks 1AF005A-H Throttled/Open for selected SG(s). • Checks AFW pumps still not running/ No AF flow established, and report same to US.

	RO/BOP	Prepare FW System for Restoration:
		• Checks at least one CD/CB pump running.
		• Place valves in Manual at Zero Demand:
		  • FW Reg valves (1FW510, 520, 530, 540).
		  • FW Bypass Reg Valves (1FW510A, 520A, 530A, 540A).
		  • Tempering Flow Control Valves (1FW034A-D).

	US	Dispatch NSO to Remove Fuses for FWI: • At 1PA27J, fuses 24 and 27. • At 1PA28J, fuses 24 and 27.

Comments: ____

Scenario No: 01-2		Event No. 6 and 7
Event Description:		Loss of 6.9 KV Bus 159 no ABT resulting in a partial Loss of Flow ATWS. Turbine fails to trip – Loss of Heat Sink. During ATWS Control rods fail to move, and 1 emergency boration flow path is unavailable.
Time	Position	Applicant's Actions or Behavior
	RO/BOP	Try to establish Main FW Flow to at least one SG: • Open FW Tempering Isol Valve on selected SG(s)- 1FW035A/B/C/D. • Determine neither the S/U Feedwater pump nor the 1A MFP is available.
	RO/BOP	Try to establish condensate booster flow to at least one SG: • Close FW pump recirc valves (1FW076, 1FW012A, B, and C). • Start Aux Oil Pump for Selected FW pump. • Open Selected FW pump Discharge Valve(s)- 1FW002A and 1FW016, or 1FW002B or 1FW002C, or 1FW059. • Verify HD pumps tripped.

	US	Review Feed Flow Limitations before initiating feed flow:
		• Determines bleed and feed has been initiated and is either
		  • Effective in preventing further rise in CETCs, in which case the limitations are:
		    • Feeds any Non Dry SG with Non voided feedlines at desired rate.
		    • If all SGs are dry, feeds one SG at 40-80 gpm for 15 minutes, then after 15 minutes does NOT exceed 100 gpm feed rate. When SG WR level >10% (27% Adverse) feed rate may be increased as desired.
		
		OR
		
		  • Ineffective (CETCs are still rising) in which case the limitations are:
		    • Feeds any non-dry S/Gs at maximum rate until CETCs decrease. Then feeds at desired rate.
		    • If all S/Gs are dry, feeds one S/G at maximum rate until CETCs decrease then feeds restored S/G at desired rate; checks for faults or ruptures.

Comments: ____

Scenario No: 01-2		Event No. 6 and 7
Event Description:		Loss of 6.9 KV Bus 159 no ABT resulting in a partial Loss of Flow ATWS. Turbine fails to trip – Loss of Heat Sink. During ATWS Control rods fail to move, and 1 emergency boration flow path is unavailable.
Time	Position	Applicant's Actions or Behavior
	RO/BOP	Establish Condensate Booster Flow to Selected SG(s): • Open Tempering flow control valve on selected SG(s) 1FW034A/B/C/D. • Depressurize at least one SG to < 650 psig via steam dumps or SG PORV(s). • Maintain Hotwell level > 7 inches • Check Wide Range SG level increasing.
		Scenario is complete at this point or at the Chief examiners discretion

Comments: ____

Simulation Facility Braidwood		Scenario No.: 01-3	Operating Test No.: 1
Examiners: ______________		Applicant: ______________	SRO
______________		______________	RO
______________		______________	BOP

Initial Conditions: IC-174, 25% power, following a restart from a trip from full power 12 hours ago.

Turnover: Ramp to full power. 1A RH and 1A MFP pumps are unavailable. MESACs were completed for 1D SGWLC instrumentation on the previous shift. 1BwGP 100-3 step 45 in progress.

Event No.	Malf. No.	Event Type*	Event Description
Preload	CS01A RH01A RF RP63 OUT RH04B Override	C BOP C BOP SRO C BOP SRO	1A Containment Spray pump fails to start Auto or Manually. 1A RH pump fail to start. 1B Containment Spray pump fails to start Auto (Manual Avail) 1B Containment Sump Recirc Isol valve stuck closed.
1		R RO SRO N BOP	Raise Reactor power with dilution and control rods. Ramp up turbine power from 25% to full power.
2	CH08D, 60	I BOP SRO	Containment Pressure Transmitter 1PT-937 fails high. DP low pump trip F.T.S. start man. start
3	NI09B, 120	I RO SRO	Power Range Channel N42 fails high.
4	CV27C, 3.3, 1 min ramp	C RO SRO	1C RCP #1 Seal Leakage (degradation).
5	CV15, 50	C BOP SRO	50 gpm Seal water heat exchanger leak, CCW into seal return. 112 fail to auto divert
6	CV27C, 10, 5 min ramp	C RO SRO	1C RCP #1 Seal Leakage worsens, requiring reactor trip.
7	TH06C, 540K (Trigger)	M RO SRO BOP	Large break LOCA at time of Reactor Trip.
8	Preload	C BOP SRO	Containment Spray failure, only one train available.
9	Preload	M RO SRO BOP	Loss of Emergency Coolant Recirculation.

*(N)ormal, (R)eactivity (I)nstrument, (C)omponent, (M)ajor Transient

SCENARIO 01-3 OVERVIEW

The scenario begins with the plant at approximately 25% power with orders to ramp up to full power. The turnover includes information that the 1A RH pump is unavailable due to a scheduled work window, 1A MFP is unavailable due to breaker cubicle work, and MESACS were completed for 1D SGWLC instrumentation on the previous shift.

After clearly observable plant response to the requested reactivity change, a Containment Pressure channel will fail high. The BOP and RO will diagnose the failure from annunciators, instrumentation indications, and the bistable light. The SRO will enter 1BwOA INST-2 Attachment J, "OPERATION WITH A FAILED CHANNEL – CONTAINMENT PRESSURE CHANNEL FAILURE," and direct actions to trip the bistable and investigate Tech Specs. LCO 3.3.2 condition E applies. Maintenance will investigate as requested.

After the bistable is tripped for the containment pressure channel, a Power Range Channel will fail high causing inward rod motion. The RO will diagnose the failure from control board indications and alarms and place rod control in manual. The ramp up may be suspended. The SRO will enter 1BwOA INST-1 Attachment A, "NUCLEAR INSTRUMENTATION MALFUNCTION – PR CHANNEL FAILURE," and direct actions to defeat the channel, restore Tave and automatic rod control, trip bistables, and investigate Tech Specs. LCO 3.3.1 conditions D and E apply. Maintenance will investigate as requested. The ramp up may be restarted if suspended earlier.

After the bistables are tripped for the failed NI, 1C RCP seal will begin to leak abnormally. The RO will diagnose the failure from RCP parameters, and the SRO will enter 1BwOA RCP-1, "REACTOR COOLANT PUMP SEAL FAILURE". The crew will determine the seal problem is real, not an instrumentation problem, and commence a shutdown.

While preparations are being made to shutdown the unit, a seal water heat exchanger tube leak will occur, causing a decreasing Surge Tank level, and a dilution of the RCS from Component Cooling water entering the flowpath to the CV pumps. The problem will be diagnosed by the BOP from makeup occurring to the CCW surge tank. The SRO will enter 1BwOA PRI-12, "UNCONTROLLED DILUTION", and/or 1BwOA PRI-6," COMPONENT COOLING MALFUNCTION", and direct actions to isolate and bypass the seal water heat exchanger. Control rods will be verified to be above the RIL to satisfy Tech Specs.

After the seal water heat exchanger is bypassed, the 1C RCP seal leak gets worse and exceeds the limit requiring a trip. At the time of the reactor trip, a large break LOCA occurs. The SRO will enter and direct actions of 1BwEP-0, "REACTOR TRIP OR SAFETY INJECTION". Containment pressure will exceed the Containment Spray actuation setpoint. One train of CS will not start, the other train must be manually started due to a slave relay failure. An RCS LOCA will be diagnosed and a transition to 1BwEP-1, "LOSS OF REACTOR OR SECONDARY COOLANT" will be made. If, after Status Tree monitoring is commenced, containment pressure remains above the CS actuation setpoint, a transition to 1BwFR-Z.1, "RESPONSE TO HIGH CONTAINMENT PRESSURE" will be made. A Challenge to the Integrity Status Tree will also be identified, and implementation of 1BwFR-P.1, "RESPONSE TO IMMINENT PTS CONDITION" will result in the performance of just the first step before exiting this procedure. When the LO-2 RWST level is reached, the crew will transition to 1BwEP ES-1.3, "TRANSFER TO COLD LEG RECIRCULATION". A

Comments: ______________________________

failure of the B Train sump recirculation valve will occur, requiring a transition to 1BwCA-1.1, "LOSS OF EMERGENCY COOLANT RECIRCULATION". The SRO will direct one operator to add make up to the RWST, and direct the other operator to stop the running CS pump. Minimum ECCS flow will be established to the RCS. The scenario is terminated after make-up is established to the RWST.

Critical Tasks

E-0—E: Manually actuate at least the minimum required compliment of containment cooling equipment before an extreme (red path) challenge develops to the containment critical safety function.

ECA-1.1—A: Stop ECCS pumps with suctions aligned to the RWST before they cavitate and trip. (applicable when RWST < 7%).

ECA-1.1—B: Makeup to the RWST and minimize outflow.

Comments: ____

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SIMULATOR OPERATOR NOTES

Simulator Setup:
Init IC____, 25% power, 12 hours after a trip from full power.
Align switches. Perform "Ready for Training" checklist. Place Hotwell Placard to '89'.
Insert PRELOAD Events:
Place 1A MFP control Switch in Pull Out and hang tag.
Place 1A RH pump control switch in Pull Out and hang tag. IMF RH01A 1A RH pump fails to start.
IMF CS01A 1A CS pump fail to start.
MRF RP63 OUT 1B CS pump fails to automatically start.
IMF RH04B 1SI8811B fails to auto open.
IOR ZDI1SI8811B CLOSE override control switch for 1SI8811B to prevent manual open.
Place orange dot on 1CV112 controller (set at 6.0)
Fill out flowchart for 100-3 thru step 44.

To prevent inaccurate sim response to seal water heat exchanger leak, fail the Rad monitors for CC Hx outlet "AS IS".
OPR09J
1PR09J.

Event 1 Power Ramp from 25% to full power.
As SM acknowledge ramp initiation.
Support requests for MFP startup.
As RP/HP/Chemistry acknowledge sample requirements for load change > 15% in one hour.

Event 2 Containment Pressure Channel 1PT-937 fails high (60 psig).
SDG: CH6
Malf: CH08D, 60 psig.
Initiate event after clearly observing reactivity change/response of plant from requested power ramp or upon lead examiners cue.
Role play as U-2 admin and/or extra NSO to accomplish bistable tripping. Acknowledge all info passed to the SM, WEC, and maintenance.

SDG: RP13

Cabinet door #1 open				RF	RX20	OPEN
CS and Phase B	PB937A	C1-754	BS-1	RF	RP18	TRIP
Cabinet door #1 close				RF	RX20	CLOSE

Event 3 Power Range Channel N42 fails high (120%, no ramp).

Comments: ____________________

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SDG: NI6
Malf: NI09B, 120%
Initiate power range channel failure after tripping bistables and investigating Tech Specs for the containment pressure channel failure, or at the lead examiners cue.

Role play as U-2 admin and/or extra NSO to accomplish bistable tripping.
Acknowledge all info passed to the SM, WEC, and maintenance.

SDG: RX4

Cabinet door #2 open				RF	RX21	OPEN
OTDT Trip	TB421C	C2-124	BS-3	RF	RX017	TRIP
OTDT Runback	TB421D	C2-124	BS-4	RF	RX137	TRIP
Cabinet door #2 close				RF	RX21	CLOSE\

Event 4 1C RCP #1 Seal Leak (3.3 gpm plus normal, total needs to be between 6 and 8 gpm) 1 minute ramp.
SDG: CV7C
Malf: CV27C, 3.3 gpm, 1 minute ramp
Role play as necessary for requested cnmt entry to check #2 seal leakoff. 3
If asked, report the RCDT pumps switch at the RWP panel is in REMOTE, and the switch for 1RE1003 is in AUTO.
As system engineer (Tom Cole) acknowledge the request for assistance, and that you'll monitor vibrations and seal performance.

Event 5 Seal water Heat Exchanger Leak (50 gpm CCW to Seal return – dilution of VCT).
SDG: CV6
Malf: CV15, 50 gpm
Initiate Seal Water Hx leak after crew makes decision to commence a S/D due to RCP seal conditions, or at lead examiners cue.

When asked as local operator, report the position of the following valves:

1CV8441	Locked Closed
1CV8435	Locked Closed
1CV8453	Locked Closed
1AB8629A	Closed

When asked as local operator to Isolate CC flow for the Seal Water Heat Exchanger:
SDG: CV6
CLOSE 1CC9449A
CLOSE 1CC9449B

Comments: ____________________

When asked to swap the VCT inlet valves:
OPEN 1CV8482
CLOSE 1CV8484

Acknowledge all info passed to the SM, WEC, and maintenance.

Event 6 1C RCP #1 Seal Leakage increases to 10 gpm over 5 minutes, requiring reactor trip.
SDG: CV7C
Malf: CV27C, 10gpm, 5 minute ramp.
Initiate additional RCP seal leakage after VCT inlets are swapped, or at lead examiners cue.

NOTE: Ensure Event 7 (LBLOCA) is ready on a trigger to initiate when the reactor is tripped. Also ensure, 1A CS pump will fail to start, and 1B Train CS will only manually start due to the slave relay failing to auto open 1CS019A.

Event 7 Large Break LOCA.
SDG:
Malf: TH06C, 540,000 gpm
Initiates on trigger at time of reactor trip due to degrading conditions on the 1C RCP #1 Seal.
NOTE: Ensure malfunction to keep 1SI8811B from auto swapping to the containment Recirc Sump is active, and the OVERRIDE for the 1SI8811B Control Switch prevents manual opening of the valve.

When dispatched to locally open 1SI8811B, report the valve hand wheel turns, but it does not appear that the stem is moving. Power is RF ED07A N, OPEN (132X4 H1)

1A RH pump is not available for at least 45 minutes if asked.

Acknowledge all info passed to the SM, WEC, and maintenance.
Respond as STA to monitor Status Trees when asked.

If asked, clear tags and energize the SVAG valves:
SDG: SIP
Use RF: ED55E to re-energize 1SI8806 at 131X1A:P3
And RF: ED72B to re-energize 1SI8813 at 132X4A:L3.

Perform any local actions as requested to align make up to the RWST per BwOP SI-13.
Either report key for 1CV8553 is in the Locked Close Location in the Locked Valve Key Cabinet, or
Report from local observation that 1CV8553 is Locked Closed.
SDG: CV4
CLOSE 1CV8428

Comments: ______________________________

OPEN 1CV8432
UNLOCK and OPEN 1CV8434 (Not modelled)

If asked for H2 monitors:
SDG: CH4
RFCH01 LOW
RFCH06 LOW

Comments: ____

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Scenario No: 01-3		Event No. 1
Event Description:		Continue ramp up towards full power by raising reactor power and turbine load.
Time	Position	Applicant's Actions or Behavior
	CUE	Turnover information provided cues to continue ramp towards full power.
	US	Implement actions of 1BwGP 100-3, Rev 20, Step F.
	US	Direct load increase to 620 MW at 5 MW/min. • Initiate load swing instruction sheet (1BwGP-1004T2 Boration Dilution Boundary Calculation). • Contact Chemistry and HP for load change > 15%/hr.
	CREW	Review applicable Precautions, and Limitations and Actions.

Comments: ______________________________

Scenario No: 01-3		Event No. 1
Event Description:		Continue ramp up towards full power by raising reactor power and turbine load.
Time	**Position**	**Applicant's Actions or Behavior**
	RO	Verify rod position and boron concentration. Initiate dilution (BwOP CV-5, Rev 13) Determine required dilution volume by: o Effects of previously performed dilutions o Braidwood Boration Dilution Tables • Determine required PW flow rate. • Set 1FK-111 PW/Total Flow Control to desired dilution rate. • Set 1FY-0111 Primary Water Control Preset Counter to desired volume. • Place MAKE-UP CONT SWITCH to STOP position. • Set MU MODE SELECT to Alt DIL position. • Place MAKE-UP CONT Switch to START o Verify proper operation of valves (CV111A throttles open, CV110B open, PW flow on recorder) OR Batch addition: • Open CV110B. • Open CV111A. • When desired amount of primary water added: • Close CV111A. • Close CV110B.
	BOP	Initiate turbine load increase: • Depress LOAD RATE MW/MIN • Enter 5 MW/min • Depress REF • Enter power level (620 MW) • When ready to begin load increase, depress GO • Verify load increases.

Comments: ____

Scenario No: 01-3		Event No. 1
Event Description:		Continue ramp up towards full power by raising reactor power and turbine load.
Time	Position	Applicant's Actions or Behavior
	RO	Monitor power increase: • Monitor reactor power, Tave, ΔI • Verify rods move in AUTO to maintain Tave within ± 1.0°F of Tref. If diluting: • Monitor VCT level • Verify RCS boron concentration decreasing • Monitor PW/Total counter • Verify dilution auto stops at preset value. • Return Reactor Makeup System to blended flow at current boron concentration.
		Note: Following clearly observable plant response from the reactivity changes, Event 2 is entered.

Comments: ____

Scenario No: 01-3		Event No. 2
Event Description:		Containment Pressure Transmitter 1PT-937 Fails High.
Time	Position	Applicant's Actions or Behavior
	CUE:	Annunciators: 1-3-D4 CNMT PRESS HIGH Recorder Indication Bistable light CNMT PRESS HI-3 PB937A Meter indication
	BOP/US	Diagnose/Announce failure of 1PT-937.
	US	Acknowledge Failure and implement 1BwOA INST-2 Attachment J, OPERATION WITH A FAILED INSTRUMENT< CONTAINMENT PRESSURE CHANNEL FAILURE., and direct actions. • Announce procedure entry and get acknowledgements from RO and BOP. • Inform SM of plant status, GSEP evaluation. • Direct WEC to write AR, CR, and get maintenance involved. • Brief BOP and Unit 2 Admin NSO on Bypassing Bistable for CS and Phase B.
	BOP	Perform actions as directed by US: • Coordinate Bypassing bistable for Spray Actuation and Cnmt Isolation Phase B
	RO	Perform actions as directed by US: • Investigate BwARs. • Contact maintenance. • Verify proper alarms annunciate on Bypass Permissive panel. • Monitor plant parameters.
	US	Investigate Tech Specs: • Spec 3.3.2 Condition E, Place Channel in Bypass within 6 hrs.
		Note: Following Tech Spec determination, initiate Event 3.

Comments: ____

Scenario No: 01-3		Event No. 3
Event Description:		Power Range Channel N-42 Fails High
Time	Position	Applicant's Actions or Behavior
	CUE:	Annunciators: 1-10-B5 PWR RNG FLUX HIGH ROD STOP 1-10-C3 PWR RNG FLUX RATE RX TRIP ALERT 1-10-C3 PWR RNG CHANNEL DEV Rods Stepping Inward Meter indications NR-45 Recorder Indications
	RO/US	Diagnose/Announce Power Range Channel failure (N-42)
	US	Announce procedure entry 1BwOA INST-1, Attachment A, NUCLEAR INSTRUMENTATION MALFUNCTION, POWER RANGE CHANNEL FAILURE, and direct actions: • Announce procedure entry and get acknowledgements from RO and BOP. • Inform SM of plant status, GSEP evaluation. • Direct WEC to write AR, CR, and get maintenance involved. • Brief RO and U-2 Admin NSO on bistable tripping for N-42. • Refer to Tech Specs: • Spec 3.3.1 Conditions D and E apply, 6 hrs to trip channel. Perform a risk assessment. Return to procedure and step in effect (1BwGP 100-3, power Ascension)
	RO	Perform actions as directed by US: • Take Rod Control to Manual • Determine PWR RNG FLUX HIGH ROD STOP (1-10-B5) is Lit. • Check Tave – Tref deviation stable and within 1 degree F. If NOT: • Adjust Rods or turbine or boron to restore to within 1 degree F. o Check to ensure no coincidences will be made up when bistables are tripped. • Coordinate bistable tripping for OTDT Trip and OTDT Runback. • Ensure Operable channel selected to the DT recorder. • Determine Turbine Low Power Interlock C5 is Not lit. • Restore Auto rod control when Tave – Tref deviation is stable and within 1 degree F.

Comments: ____

Scenario No: 01-3		Event No. 3
Event Description:		Power Range Channel N-42 Fails High
Time	Position	Applicant's Actions or Behavior

	BOP	Perform actions as directed by US:
		• At 1PM07J, Bypass ROD STOP for channel N-42.
		• Check SG levels normal and stable.
		• At 1PM07J, Bypass the following functions for N-42:
		  • Upper Section of the Detector Current Comparator.
		  • Lower Section of the Detector Current Comparator.
		  • Power Mismatch Bypass
		  o Rod Stop Bypass (if not done previously).
		  • Comparator Channel defeat
		• Remove Control Power Fuses for N-42
		• Control turbine ramp.

		NOTE: Once the proper bistables have been tripped and tech specs determined, initiate EVENT 4.

Comments: ____

Scenario No: 01-3		Event No. 4
Event Description:		1C RCP #1 Seal leakage (degradation).
Time	Position	Applicant's Actions or Behavior
	CUE	Annunciators: 1-7-B3 RCP SEAL LEAKOFF FLOW HIGH #1 Seal Leakoff Recorder indication
	RO/US	Diagnose/Announce RCP Seal problem
	US	Announce entry into 1BwOA RCP-1 RCP SEAL FAILURE, and direct actions: • Get acknowledgements for procedure entry from RO and BOP. • Inform SM of plant status, evaluate for GSEP. • Direct WEC to write AR, CR, and get maintenance/engineering involved.
	RO	Perform actions of 1BwOA RCP-1 as directed by US: • Determine #1 Seal Delta P is > 200 psid. • Determine #1 Seal leakoff to be > 5 gpm and provide input to US.
	BOP/RO	Perform actions of 1BwOA RCP-1 as directed by US: • Trend RCP parameters on the computer to determine there is NO failed instrument.

	RO	Perform actions as directed:
		• Maintain $\geq$ 9 gpm seal injection flow to 1C RCP #1 Seal.
		• Monitor seal conditions:
		  • #1 seal leakoff flow < 8 gpm.
		  • RCP lower Radial Bearing Temperature Stable or decreasing and < 225 degrees F.
		  • RCP seal outlet temperature stable or decreasing and < 235 degrees F.
		
		If any of the above conditions exceeded, report to US so that an immediate trip can be initiated.
		
		• #1 Seal leakoff flow < 6 gpm. If not, then report to US so that a controlled shutdown can be initiated.

	US	Direct actions outside the control room: o Direct the WEC/Field Supervisor to assemble a team to enter containment and locally check 1C RCP #2 seal leakoff flow status.
	RO	Perform actions as directed: • Determine sum of #1 and #2 seal leakoff is between 6 and 8 gpm.

Comments: ____

Scenario No: 01-3		Event No. 4
Event Description:		1C RCP #1 Seal leakage (degradation).
Time	**Position**	**Applicant's Actions or Behavior**
	US	Initiate a controlled shutdown of the Unit per 1BwGP 100-4, POWER DESCENSION, to be off line and have the 1C RCP stopped within 8 hours.
	RO	Continue to monitor the condition of the 1C RCP: • #1 and #2 Total Seal leakoff between 6 and 8 gpm. • RCP lower bearing temps stable and < 225 degrees F. • RCP Seal outlet temp stable and < 235 Degrees F. If conditions exceeded, inform US to perform immediate trip.
		NOTE: While preparations are being made to shutdown the unit proceed to event 5.

Comments: ____________________

Scenario No: 01-3		Event No. 5
Event Description:		50 gpm Seal Water Heat Exchanger Tube Leak
Time	Position	Applicant's Actions or Behavior
	CUE	Annunciators: 1-2-E4 CC SURGE TANK AUTO M/U ON Decreasing CC Surge Tank level Auto makeup to the CC Surge Tank. VCT level Increasing
		Note: Crew may enter 1BwOA PRI-6, Component Cooling Malfunction and/or 1BwOA PRI-12, Uncontrolled Dilution.
	US/BOP	Diagnose/Announce decreasing CC Surge Tank level. Direct BOP to refer to BwAR. Enter 1BwOA PRI-6 COMPONENT COOLING MALFUNCTION, and direct actions: • Get acknowledgements for procedure entry from RO and BOP. • Inform SM of plant status, evaluate GSEP. • Direct WEC to write and AR, CR, and get maintenance involved.
	BOP	Perform actions of 1BwOA PRI-6, as directed: • Determine surge tank level is > 13 %, and is being maintained by auto make-up but is NOT STABLE.
	US	Directs actions of Attachment B, ABNORMAL CC SURGE TANK LEVEL.
	BOP	Performs actions of Attachment B as directed: • Reports surge tank level is decreasing but > 50% and is being maintained by auto make up.
	RO	Performs actions as directed: • Diagnoses and reports unexpected increase in VCT level.

Comments: ______________________________

Scenario No: 01-3 Event No. 5

Event Description: 50 gpm Seal Water Heat Exchanger Tube Leak

Time	Position	Applicant's Actions or Behavior
	US	Directs the following actions: • Locally isolate seal water heat exchanger- close 1CC9449A and 1CC9449B. o Open seal water heat exchanger to top of VCT isolation valve 1CV8482 o Close seal water heat exchanger outlet to bottom of VCT isolation valve 1CV8484. • Initiate boration as necessary to maintain RCS Temperature. • Monitor CC Surge tank to determine out leakage isolated. Level stable and makeup valves closed.

	BOP	Performs actions of 1BwOA PRI-6 as directed:
		• Determines at least one CC pump is running.
		• Checks CC PUMP DSCH PRESS LOW (1-2-B5) is NOT LIT.
		• Checks CC PUMP SUCT TEMP HIGH (1-2-D5) is NOT LIT.
		• Checks CC Hx outlet is < 120 degrees F and < 105 degrees F.
		• RCPs are all running.
		• CC flow to the RCPs is Normal:
		  • RCP 1_ THERM BAR CC WTR FLOW LOW (1-7-_4) NOT LIT.
		  • RCP 1_ BRNG CC WTR FLOW LOW (1-7-_5) NOT LIT.
		  • RCP THERM BARR CC WTR TEMP HIGH (1-7-E3) NOT LIT.
		  • RCP THERM BARR CC WTR FLOW HIGH LOW (1-7-E4) NOT LIT.
		  • RCP BRNG CC WTR TEMP HIGH (1-7-E5) NOT LIT.
		• Checks HMI or RM11 rad monitor trends for CC Hx outlet Normal
		• Checks 1CC685 Open.
		• RCPs temperatures:
		  • Motor bearing temps < 195 degrees F.
		  • Lower Radial Bearing Temps < 225 degrees F.
		  • Seal Outlet Temps < 235 degrees F.
		• Checks CC Surge tank between 50 and 65%.

	RO	Performs actions of 1BwOA PRI-6 as directed: • Checks letdown in service. • Checks LTDWN HX OUTLET TEMP HIGH (1-8-C5) NOT LIT. • Checks LTDWN TEMP HIGH (1-9-E2) NOT LIT.
	US	Refers to tech specs: 3.7.7; 3.6.3, and has the SM perform a risk assessment. Returns to step and procedure in effect (for shutting down unit)
		Note: Crew may enter 1BwOA PRI-12 Uncontrolled Dilution.

Comments: ____

Scenario No: 01-3		Event No. 5
Event Description:		50 gpm Seal Water Heat Exchanger Tube Leak
Time	Position	Applicant's Actions or Behavior
	US	Announces procedure entry and directs actions for 1BwOA PRI-12, UNCONTROLLED DILUTION: • Gets acknowledgements from RO and BOP. • Informs SM of plant status, evaluate GSEP.

	RO	Performs actions of 1BwOA PRI-12 as directed:
		• Places Make-up Control Switch in OFF.
		• Checks valves closed:
		  • 1CV111A
		  • 1CV111B
		  • 1CV110A
		  • 1CV110B
		• Verify BTRS Mode Selector Switch in OFF.
		• Checks Letdown temperature > 80 degrees F.
		• Determines an unexpected VCT level increase is occurring/ CC surge tank level decrease is occurring.

	CREW	Dispatch operator to verify dilution paths isolated: • 1CV8441 locked closed • 1CV8435 locked closed • 1CV8453 locked closed • 1AB8629A closed
	US	Directs the following actions: • Locally isolate seal water heat exchanger- close 1CC9449A and 1CC9449B. • Open seal water heat exchanger to top of VCT isolation valve 1CC8482 • Close seal water heat exchanger outlet to bottom of VCT isolation valve 1CC8484.

Comments: ____

Scenario No: 01-3		Event No. 5
Event Description:		50 gpm Seal Water Heat Exchanger Tube Leak
Time	Position	Applicant's Actions or Behavior

	RO	Performs the following actions to determine if dilution is terminated:
		• Reports Unit is in Mode 1, RCS Tave is stable, rods are not inserting in auto, and power is stable.
		
		If not, then borates as necessary to maintain RCS Tave-Tref within 5 degrees F, and adjusts rods to control Delta I.
		
		• Checks BDPS ACTUATED CHG SUCT SWITCH OVER (1-10-E5) NOT LIT.
		• 1CV112D and 1CV112E are Closed.
		• Aligns RMCS for Auto:
		  • BA flow controller set for current RCS boron concentration.
		  • BA flow controler in Auto.
		  • Mode Select switch in Auto.
		  • Control switches for 1CV111A, 1CV111B, 1CV110A, and 1CV110B in auto.
		  • Makeup Control Switch in Start
		
		• Checks rods > LO-2 insertion limit.

	US	Refers to tech specs: 3.1.1, 3.1.6, 3.9.1, 3.9.2, TRM 3.1.i and determines no further actions are required. Returns to procedure and step in effect (shutting down the unit).

Comments: ____

Scenario No: 01-3	Event No. 6 and 7
Event Description:	1C RCP Seal leak worsens requiring Rx Trip, resulting in LBLOCA. Only one CS Train Available, Loss of Emergency Coolant Recirculation.

Time	Position	Applicant's Actions or Behavior
	CUE	Increasing #1 Seal leak off beyond 8 gpm. Increasing #1 Seal outlet temperatures and bearing temperatures. Rapid decrease in RCS Pressure to Cnmt pressure. Rapid Decrease in PZR level to zero. Both CS trains fail to Auto start. Recirc Sump Isolation valve fails to open
	RO/US	Diagnose/announce increasing leakage from 1C RCP #1 Seal.
	US	Directs a manual reactor trip, then after verifying the reactor trip, orders a trip of the 1C RCP. + closure of Pzr Spray Valves Enters 1BwEP-0, REACTOR TRIP OR SI, and directs actions: • Gets acknowledgements from RO and BOP • Informs SM of plant status, evaluate GSEP.

	RO	Performs Immediate Actions of 1BwEP-0, REACTOR TRIP OR SI:
		• Verify Reactor Trip:
		  • Verify Rod Bottom Lights Lit.
		  • Verify Reactor Trip and Bypass Breakers are Open.
		  • Verify Neutron Flux is Decreasing
		• Determine SI Status:
		  o Check any SI First Out Annunciator Lit or
		  o SI Actuated permissive Light Lit or
		  o SI Equipment Automatically Actuated (either SI pump running or 1SI8801A/B open).
		• Manually Actuate SI

	BOP	Performs Immediate Actions of 1BwEP-0, REACTOR TRIP OR SI:
		• Verify Turbine Trip:
		  • All Turbine Throttle Valves Closed.
		  • All Turbine Governor Valves Closed.
		• Verify Power to 4KV ESF Buses:
		  • Bus 141 energized
		  • Bus 142 energized

Comments: ______________________________

Scenario No: 01-3		Event No. 6 and 7
Event Description:		1C RCP Seal leak worsens requiring Rx Trip, resulting in LBLOCA. Only one CS Train Available, Loss of Emergency Coolant Recirculation.
Time	**Position**	**Applicant's Actions or Behavior**

	BOP	Performs subsequent actions of 1BwEP-0, REACTOR TRIP or SI, as directed:
		• Verify FW Isolation:
		  • FW pumps Tripped
		  • FW Isolation monitor lights Lit.
		  • FW Pumps Discharge Valves (1FW002A, 1FW002B, and 1FW002C) Closed.
		
		• Verify RCFCs running in Accident Mode:
		  • Group 2 RCFC Accident Mode status lights Lit.
		
		• Verify Containment Isolations:
		  • Cnmt Isolation Phase A- Group 3 Cnmt Isol monitor lights Lit.
		  • Cnmt Ventilation Isolation -Group 6 Cnmt Vent Isol monitor lights Lit.
		
		• Verify AF system:
		  • AF pumps –Both Running
		  • 1AF013A-H Open.
		  • 1AF005A-H Throttled.
		
		• Verify CC and SX pumps Running:
		  • Both CC pumps running.
		  • Both SX pumps running.
		
		• Verify Main Steam Line Isolation:
		  • Check SG pressures All > 640 psig.
		  • Check Cnmt Pressure > 8.2 psig.
		  • Verify MSIVs and MSIV Bypass valves all closed.

	RO	Performs subsequent actions of 1BwEP-0, REACTOR TRIP or SI, as directed:
		• Verify ECCS pumps running
		  • Both CV pumps running
		  • Both SI pumps running
		  • 1B RH pump running (1A RH pump is Not available.)

Comments: ____

Scenario No: 01-3		Event No. 6 and 7
Event Description:		1C RCP Seal leak worsens requiring Rx Trip, resulting in LBLOCA. Only one CS Train Available, Loss of Emergency Coolant Recirculation.
Time	Position	Applicant's Actions or Behavior

	BOP	Perform actions of 1BwEP-0, REACTOR TRIP or SI, as directed:
		• Determine Containment pressure has exceeded the Containment Spray Actuation Setpoint (20 psig) and has NOT automatically actuated.
		• Stop All RCPs.
		• Determines Group 6 CS monitor lights are NOT Lit.
		• Manually Actuates CS and Phase B Isolation and reports not all group 6 CS monitor lights are lit:
		  • 2/2 switches from 1PM05J and/or
		  • 2/2 switches from 1PM06J

	US	Directs the performance of 1BwEP-0, REACTOR TRIP or SI, ATTACHMENT B, MANUAL CS ACTUATION.

	BOP
	
	CT
	E-0—A.
		Performs the actions of ATTACHMENT B, MANUAL CS ACTUATION as directed:
		• Check CS Valve Alignment:
		  • CS pump RWST Suction valves Open- 1CS001A and 1CS001B.
		  • Check CS pump header isolation valves Open- 1CS007A and 1CS007B.
		  • Determines CS eductor Spray Additive valves did NOT Open and performs the following:
		    • Places 1B CS pump test switch in TEST.
		    • Manually Opens 1CS019B.
		    • Places 1B CS pump test switch in NORMAL
		  • Check CS eductor inlet flow control valve (1CS010B) Open.
		  • Checks 1B CS pump running.
		  o Dispatches operator to check why 1A CS pump fail to start.
		
		• Check Group 6 CS monitor lights Lit.
		• Check Group 6 Phase B Isolation monitor lights Lit.
		• Check CS eductor suction flow on running pump (1FICS014) > 15 gpm.
		• Check CS eductor additive flow on running pump (1FI-CS016) > 5 gpm.

	BOP	Performs subsequent actions of 1BwEP-0, REACTOR TRIP or SI, as directed: • Verify Total AF flow > 500 gpm. • Controls feed flow to maintain narrow range SG level between 10% (31% Adverse) and 50%. • Determines Narrow Range Levels NOT increasing in an uncontrolled manner.
	RO	Performs subsequent actions of 1BwEP-0, REACTOR TRIP OR SI, as directed: • Verify ECCS valve alignment: • Group 2 Cold Leg Injection monitor lights required for ECCS valve alignment Lit.

Comments: ____

Scenario No: 01-3		Event No. 6 and 7
Event Description:		1C RCP Seal leak worsens requiring Rx Trip, resulting in LBLOCA. Only one CS Train Available, Loss of Emergency Coolant Recirculation.
Time	Position	Applicant's Actions or Behavior
	RO	Verify ECCS flow: • High Head Flow (1FI-917) > 100 gpm. • RCS Pressure (1PI-403A/405) < 1700 psig. • SI pump discharge flow (1FI-918/922) > 200 gpm. • RCS pressure < 325 psig. • 1B RH pump discharge flow (1FI-619) > 1000 gpm.
	RO	Check at least one PZR Porv Relief Path available: • PORV Isolation valves (1RY8000A and 1RY8000B) energized and Open • PORVs (1RY455A and 1RY456) in AUTO, with associated block valve open.

	BOP	Performs subsequent actions of 1BwEP-0 as directed:
		• Verify Generator Trip – OCB 1-8 and OCB 7-8 Open; PMG Breaker Open.
		• Verify Emergency Diesel Generators running, with cooling valves open (1SX169A and 1SX169B); dispatches operator to locally check diesel operation.
		• Verify Control Room Ventilation Aligned for Emergency Operation:
		  • Checks RM-11, Grid 2, 0PR31J-0PR34J < high alarm setpoint.
		  • Checks operating VC train equipment running:
		    • Supply fan
		    • Return fan
		    • M/U fan
		    • Chilled Water pump
		    • MCR Chiller
		  • Checks Operating VC train dampers aligned:
		    • M/U fan outlet damper (0VC024Y/0VC08Y) NOT FULLY CLOSED.
		    • VC train M/U Filter Light Lit
		  • Checks Operating VC Train Charcoal Absorber Aligned:
		    • Bypass damper closed (0VC43Y/0VC44Y)
		    • Inlet damper Open (0VC21Y/0VC05Y)
		    • Outlet Damper Open (0VC22Y/0VC06Y)
		  • Control Room pressure (MCR/TB DP, 0PDI-VC038) > +0.125" H2O.

Comments: ____

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Scenario No: 01-3		Event No. 6 and 7
Event Description:		1C RCP Seal leak worsens requiring Rx Trip, resulting in LBLOCA. Only one CS Train Available, Loss of Emergency Coolant Recirculation.
Time	**Position**	**Applicant's Actions or Behavior**

	BOP	Verify Aux Bldg Ventilation Aligned for Emergency Operation:
		• Inaccessible Filter Plenums – Only TWO Aligned with Charcoal Absorbers On Line:
		  o Plenum A:
		    o Fan 0VA03CA Running with Flow Control Damper (0VA022Y) Open and Byp Isol Damper (0VA020Y) Closed.
		    o Fan 0VA03CB Running with Flow Control Damper (0VA023Y) Open and Byp Isol Damper (0VA436Y) Closed.
		  o Plenum B:
		    o Fan 0VA03CC Running with Flow Control Damper (0VA024Y) Open and Byp Isol Damper (0VA021Y) Closed.
		    o Fan 0VA03CD Running with Flow Control Damper (0VA025Y) Open and Byp Isol Damper (0VA437Y) Closed.
		  o Plenum C:
		    o Fan 0VA03CE Running with Flow Control Damper (0VA067Y) Open and Byp Isol Damper (0VA052Y) Closed.
		    o Fan 0VA03CF Running with Flow Control Damper (0VA072Y) Open and Byp Isol Damper (0VA438Y) Closed.

	BOP	Verify FHB Ventilation Aligned for Emergency Operation:
		• FHB Charcoal Absorbers -One Train Aligned:
		  o Train A:
		    • Fan 0VA04CA Running
		    • 0VA060Y Charcoal Absorber Inlet Isol Damper – Open.
		    • 0VA057Y Filter Flow Control Damper – Open.
		    • 0VA051Y Charcoal Absorber Bypass Isolation Damper – Closed.
		
		  o Train B:
		    • Fan 0VA04CB Running
		    • 0VA055Y Charcoal Absorber Inlet Isol Damper – Open.
		    • 0VA062Y Filter Flow Control Damper – Open.
		    • 0VA435Y Charcoal Absorber Bypass Isolation Damper – Closed.

	RO	Check PZR Spray Valves and Porvs: • Spray valves (1RY455B and 1RY455C) Closed. • Porvs (1RY455A and 1RY456) Closed.

Comments: ____

Scenario No: 01-3		Event No. 6 and 7
Event Description:		1C RCP Seal leak worsens requiring Rx Trip, resulting in LBLOCA. Only one CS Train Available, Loss of Emergency Coolant Recirculation.
Time	Position	Applicant's Actions or Behavior

	RO	Maintain RCS Temperature Control and RCP Status:
		• With NO RCPs running – RCS Cold leg temperatures all < 557 and decreasing.
		  • Maintains > 500 gpm AF flow until at least one SG is 10% (31% Adverse).
		  • Verifies All MSIVs and Bypasses are Closed.
		• Reports all RCPs are OFF.

	BOP	Evaluates for faulted SG and ruptured SG:
		• Reports NO SG pressure decreasing in an uncontrolled manner.
		• Reports NO SG completely depressurized.
		• Reports the following have all remained less than Alert Alarm Setpoints:
		  • SJAE/Gland Steam Exhaust Gas Radiation (1PR27J)
		  • SG Blowdown Liquid Radiation (1PR08J)
		  • Main Steam Line Radiation (1TR-AR022 and 1RT-AR023) for all Steam Lines.

	ROBOP	Evaluates if RCS Intact: o Cnmt Area radiation has exceeded Alert Alarm Setpoints (1RT-AR014, or 1RT-AR011/012, or 1RT-AR020/21). o Cnmt pressure has exceeded 3.4 psig. o Cnmt Floor water level has exceeded 5 inches.
	US	Diagnoses RCS is NOT Intact, and Transitions to 1BwEP-1, LOSS OF REACTOR OR SECONDARY COOLANT, and directs actions: • Get acknowledgements from RO and BOP. • Informs SM of plant status; evaluates for GSEP. • Directs STA to monitor Status Trees.
		Note: Status Tree monitoring will be performed by an instructor who will role play as the STA when asked. The Integrity Status Tree and the Containment Status Tree will both be challenged. The evaluation for the use of these procedures are found starting on page 32 for the Integrity challenge (1BwFR-P.1) and page 32 for the Containment challenge (1BwFR-Z.1).

Comments: ____

Scenario No: 01-3		Event No. 6 and 7
Event Description:		1C RCP Seal leak worsens requiring Rx Trip, resulting in LBLOCA. Only one CS Train Available, Loss of Emergency Coolant Recirculation.
Time	Position	Applicant's Actions or Behavior
	RO	Performs actions of 1BwEP-1, LOSS OF REACTOR OR SECONDARY COOLANT, as directed: • Maintains seal injection to all RCPs • Reports NO RCPs are running.

	BOP	Performs actions of 1BwEP-1, LOSS OF REACTOR OR SECONDARY COOLANT, as directed:
		• Determines all SGs are intact:
		  • No SG pressure decreasing uncontrollably.
		  • No SG completely depressurized
		
		• Determines No SGTR exists:
		  • Maintains total AF Flow > 500 gpm until at least one narrow range SG levels > 10% (31% Adverse).
		  • Controls SG levels between 10% (31% Adverse) and 50%.
		  • Reports NO SG level increasing in an uncontrolled manner.
		  • Determines all secondary radiation levels/trends are normal on the RM-11 or HMI:
		    • SJAE/GS Exh 1PR27J
		    • SG B/D 1PR08J
		    • MSL 1RT-AR022/23 for all MSLs

	RO	Check PZR PORVs and Isolation valves: • PORV Isolation valves (1RY8000A and 1RY8000B) Energized and Open. • Porvs (1RY455A and 1RY456) Closed.
	US/RO	Determines ECCS Flow should NOT be Reduced: • RCS Subcooling is NOT Acceptable per Iconic Display or Attachment A.
	BOP/US	Determines CS should NOT be Stopped: • 1B CS pump is running. • Resets CS signal • Spray Additive Tank Lo-2 Lights are NOT lit yet. • Spray Termination Criteria (2 hr run time) NOT met yet.

Comments: ____

Scenario No: 01-3		Event No. 6 and 7
Event Description:		1C RCP Seal leak worsens requiring Rx Trip, resulting in LBLOCA. Only one CS Train Available, Loss of Emergency Coolant Recirculation.
Time	**Position**	**Applicant's Actions or Behavior**

	BOP/US	Determines RH Pump should NOT be Stopped:
		• Reset SI:
		  • Depress Both SI Reset Pushbuttons.
		  • Verify SI Actuated Permissive light NOT LIT.
		  • Verify AUTO SI BLOCKED permissive light LIT.
		
		• Checks RH pump suction aligned to RWST (1RH8812B Open)
		• Checks RCS Pressure < 325 psig.

	BOP	Performs subsequent actions of 1BwEP-1 as directed:
		• Determines DGs may be stopped:
		  • Checks 4KV ESF buses energized.
		  • Checks 4KV Non-ESF buses energized.
		  • Coordinates with local operator to stop both DGs and place in standby per BwOP DG-12, DIESEL GENERATOR SHUTDOWN.

	CREW	Initiate Evaluation of Plant Status:
		• Verify Cold Leg Recirculation capability:
		  • Power available to 1B RH pump
		  • 1SI8811B valve position light lit.
		
		• Check Aux Bldg Radiation levels NORMAL for plant conditions on RM-11 or HMI:
		  • Unit 1 and Unit 2 Aux Bldg Vent Stack (1PR28J, 1PR30J, 2PR28J, 2PR30J)
		  • ECCS Pump Cubicles (1PR13J through 1RP18J)
		  • Grid 4 Aux Bldg area Radiation.
		
		• Reset Cnmt Isolation Phase A if necessary.
		
		• Place Hydrogen Monitors in service per BwOP PS-9, POST LOCA CNMT HYDROGEN MONITORING SYSTEM OPERATION.
		• Obtain samples:
		  • RCS Activity
		  • RCS Boron Concentration
		  • Cnmt Atmosphere and Cnmt Sump.

Comments: ____

Scenario No: 01-3		Event No. 6 and 7
Event Description:		1C RCP Seal leak worsens requiring Rx Trip, resulting in LBLOCA. Only one CS Train Available, Loss of Emergency Coolant Recirculation.
Time	Position	Applicant's Actions or Behavior
	BOP/US	Evaluate plant equipment: • At SM discretion, prepare both Hydrogen Recombiners for operation per BwOP OG-10, STARTUP OF A HYDROGEN RECOMBINER. • Trip all HD pumps. • Shutdown all FW pumps per BwOP FW-3, SHUTDOWN OF A TURBINE DRIVEN MAIN FEEDWATER PUMP. • Shutdown all unnecessary CD/CB pumps per BwOP-CD/CB-2, CONDENSATE/CONDENSATE BOOSTER SYSTEM SHUTDOWN. • Shutdown all unnecessary CW pumps per BwOP CW-2, CIRCULATING WATER PUMP/SYSTEM SHUTDOWN. • Shutdown chiller on Non Operating VC Train by momentarily placing control switch in Trip.
		Note: Depending on the timing, the crew may cycle back to 1BwEP-1 Step 11, to continue evaluating plant status while awaiting the RWST LO-2 setpoint. Reaching the LOW-2 RWST setpoint prior to getting to this step may also occur, necessitating a transition to 1BwEP ES-1.3 at that time, even if the crew is in the middle of one of the 1BwFR procedures.
	RO/US	Determine Transfer to Cold Leg Recirculation is necessary: • RCS pressure < 325 psig. • 1B RH pump Flow (1FI-619) > 1000 gpm. • 1BwEP ES-1.3, TRANSFER TO COLD LEG RECIRCULATION, NOT previously entered. • RWST level < 46%.
	US	Announces transition to 1BwEP ES-1.3, TRANSFER TO COLD LEG RECIRCULATION, when RWST LO-2 Level is reached, and directs actions: • Get acknowledgements from RO and BOP. • Informs SM of plant status, evaluate for GSEP. • Reviews Notes to perform steps 1-6 without delay, and to NOT implement BwFRs until completion of step 6, unless a transition to 1BwCA1.1, LOSS OF EMERGENCY COOLANT RECIRCULATION is made. • Reviews Operator Action Summary Page Item to Stop all pumps taking suction from RWST if level decreases to 7% unless suction flowpath is established from Cnmt Sump.

	BOP	Performs actions of 1BwEP ES-1.3 as directed:
		• Establishes CC flow to 1B RH heat exchanger:
		    • Opens 1CC9412B.
		    • Checks CC flow to 1B RH Hx (1FI-0688) > 5000 gpm.

Comments: ____________________

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Scenario No: 01-3		Event No. 6 and 7
Event Description:		1C RCP Seal leak worsens requiring Rx Trip, resulting in LBLOCA. Only one CS Train Available, Loss of Emergency Coolant Recirculation.
Time	Position	Applicant's Actions or Behavior
	BOP	Check Adequate Cnmt Sump Level: • CNMT Floor water level at least 8 inches (13 inches Adverse) on 1LI-PC006 or 1LI-PC007.

	BOP	Align RH Pumps Suction to Cnmt Sumps
		• Determines 1A RH pump is NOT running and Closes 1SI8812A.
		• Determines 1SI8811B did NOT AUTO Open and performs actions of Attachment A as directed.
		• Determines Train A is NOT available.
		• Reports 1SI8811B is Closed and energized, with 1B RH pump running.
		• Attempts to Manually Align 1B RH pump Suction to Cnmt Sump:
		  • Place 1B RH pump in Pull Out.
		  • Close RH pumps 1B Suction from RWST isol valve (1SI8812B)
		  • Place 1B CS pump in Pull Out
		  • Close CS pump 1B RWST Suction valve (1CS001B)
		  • Open 1B RH pump Cnmt Sump Isol valve
		  • Reopen 1CS001B
		  • Restart 1B CS pump by taking control switch out of Pull Out, (and if necessary because CS Actuation Signal has been reset with Cnmt Pressure < 20 psig, Manually Actuate CS and Phase B Isolation)
		• Determine at least one Cnmt Sump Recirc Flowpath does NOT exist:
		  • 1A RH pump is NOT available
		  • 1B RH pump is NOT aligned to Cnmt Sump.

	US	Diagnose/Announce a Loss of Emergency Coolant Recirculation, and transitions to 1BwCA-1.1, LOSS OF EMERGENCY COOLANT RECIRCULATION, and directs actions: • Get acknowledgements from RO and BOP. • Informs SM of plant Status, evaluate for GSEP.
	BOP	Performs actions of 1BwCA-1.1, LOSS OF EMERGENCY COOLANT RECIRCULATION, as directed: • Reports Train B Available – 1B RH pump is available, and 1SI8811B is energized. • Determines RWST LO-2 Level Alarm (1-6-B7) is Lit. • Determines 1SI8811B is NOT open and dispatches operator(s) to open 1SI8811B. • Verifies adequate Cnmt Sump level – at least 8 inches (13 inches Adverse) on 1LI-PC006/007. • Determine emergency coolant recirculation on at least one train NOT yet restored.

Comments: ____

Scenario No: 01-3		Event No. 6 and 7
Event Description:		1C RCP Seal leak worsens requiring Rx Trip, resulting in LBLOCA. Only one CS Train Available, Loss of Emergency Coolant Recirculation.
Time	Position	Applicant's Actions or Behavior
		Note: The following Critical Task conditions may present themselves at any time after reaching the LO-3 RWST level.
	BOP **CT: CA-1.1—A.**	Stop pumps with suctions aligned to the RWST before they cavitate and/ or Trip: • Stop 1A and 1B CV pumps • Stop 1A and 1B SI pumps • Stop 1B RH pump. • Stop 1B CS pump if suction still aligned to RWST (1CS001B still Open, and 1CS009B still closed.)

	RO	Perform actions of 1BwCA-1.1 LOSS OF EMERGENCY COOLANT RECIRCULATION, as directed:
		• Reset SI (if not previously performed):
		    • Depress Both SI Reset Pushbuttons.
		    • Verify SI ACTUATED permissive light NOT Lit.
		    • Verify AUTO SI BLOCKED permissive light Lit.
		    • Reset SI Recirc Sump Isolation valves – 1SI8811A/1CV8110 and 1SI8811B/1CV8111.

	RO **CT: CA-1.1—B.**	Add makeup to the RWST as necessary per BwOP SI-13, Filling the RWST: • Determine the required blended flow boron concentration to the RWST. • Determine the required 4% Boric Acid Flowrate to obtain the desired blended flowrate. • Place the Reactor Make-up Control Switch to Stop. • Place the Reactor Makeup Mode Selector Switch to Manual. • Set the Makeup Control System thumbwheels for Primary Water and Boric Acid to the desired numbers in accordance with BwOP CV-7. • Set the Blend Control Station 1FK110, for Boric Acid to the desired position. • Set Blend Control Station 1FK111, for Primary Water to the Desired position. • Dispatch operator to verify Close 1CV8553, Boric Acid Blender to HUT. • Dispatch operator to Close 1CV8428, BA Blender to CV pumps isolation valve. • Open 1CV110B, Boric Acid Blender to CV pumps valve. • Dispatch operator to Open 1CV8432, Boric Acid Supply to the RWST. • Dispatch operator to Unlock and Open 1CV8434, Boric Acid Supply to RWST. • Place Reactor Coolant Makeup Control Switch to Start. • Verify/Start 0PW02PA or 0PW02PB, PW Makeup Pump. • Verify/Start 1AB03P, Boric Acid Transfer Pump • Contact Chemistry to sample the Blended flow to the RWST. • Monitor Aux Bldg PR detectors (0REPR025A, B, and C) and RWST level on 1LI930-933 at 1PM06J.

Comments: ____

Scenario No: 01-3		Event No. 6 and 7
Event Description:		1C RCP Seal leak worsens requiring Rx Trip, resulting in LBLOCA. Only one CS Train Available, Loss of Emergency Coolant Recirculation.
Time	Position	Applicant's Actions or Behavior
	BOP	Perform actions of 1BwCA-1.1 as directed: • Check Intact SG levels > 10% (31% Adverse) • Control feed flow to maintain levels between 10% (31% Adverse) and 50%.
	CREW	Initiates RCS Cooldown to 200 degrees F as follows: • Maintains Cooldown rate < 100 degrees F in any one hour in the RCS Cold legs. • Determine P-11 is Lit, and Blocks Low Pressure SI, and STM Line SI. • Uses SG Porvs to dump steam as necessary. • Verify RCFCs running in Accident Mode- Group 2 RCFC Accident Mode status lights Lit.

	BOP	Perform actions of 1BwCA-1.1 for RWST LESS THAN 7%:
		• Report RWST level < 7%.
		• Stop Pumps taking suction from RWST, by taking control switches to Pull Out:
		  • 1B RH pump
		  • Both SI pumps
		  • 1B CS Pump
		  • Both CV pumps
		• Try to add makeup to RCS from Rx Makeup system:
		  • Reset Cnmt Phase A if necessary.
		  • Check SACs – Any running, restore Instrument Air to Cnmt- Open 1IA065 and 1IA066.
		  • Establish VCT level > 37%, and VCT pressure 15 to 65 psig.
		  • Open 1CV112B and 1CV112C.
		  • Close 1CV112D and 1CV112E.
		  • Check Closed 1CV8804A, 1SI8807A and 1SI8807B, or 1SI8924.
		  • Reset SI CV pump miniflow isol valves – 1CV8114 and 1CV8116
		  • Verify CV pump miniflow valves open – 1CV8110, 1CV8111, 1CV8114, and 1CV8116.
		  • Close 1SI8801A and 1SI8801B.
		  • Place 1CV182 to 0% demand.
		  • Open 1CV8105 and 1CV8106.
		  • Close 1CV8355A-D if RCP lower radial bearing temperatures >225 degrees F.
		  • Start 1CV pump.
		  • Throttle 1CV182 to maintain 8-13 gpm seal infection per RCP.
		  • Throttle 1CV121 to maintain desired charging flow.
		  • Maximize makeup to VCT.

Comments: ____

Scenario No: 01-3		Event No. 6 and 7
Event Description:		1C RCP Seal leak worsens requiring Rx Trip, resulting in LBLOCA. Only one CS Train Available, Loss of Emergency Coolant Recirculation.
Time	**Position**	**Applicant's Actions or Behavior**
	BOP/US	Perform actions of 1BwCA-1.1 for RWST level >7%: • 1B CS pump suction aligned to RWST – 1CS001B open. • Reset CS signal. • Determine NO CS pumps are required to be running, stops 1B CS pump. • Close 1CS007A and 1CS007B. • Determines ECCS is in service: • Any SI pump is running or either 1SI8801A/B is Open, or 1B RH pump is running in injection mode.
	BOP/US	Establish one train of ECCS flow: • Stops one CV pump • Stops one SI pump • Checks RCS pressure < 325 psig, and verifies only 1 RH pump is running. • Verify 1SI8812A closed
	RO/US	Determines an RCP can NOT be started due to lack of subcooling.
	CREW	Determine ECCS flow can NOT be Terminated due to inadequate subcooling.
	BOP/US	Establish minimum ECCS flow to remove decay heat: • Determine time dependant required flow • Manually align ECCS pumps to reduce flow to minimum required flow.

Comments: ____

Scenario No: 01-3		Event No. 6 and 7
Event Description:		1C RCP Seal leak worsens requiring Rx Trip, resulting in LBLOCA. Only one CS Train Available, Loss of Emergency Coolant Recirculation.
Time	Position	Applicant's Actions or Behavior
		Note: If the STA identifies a challenge to the Integrity Status Tree and recommends transition to 1BwFR-P.1 RESPONSE TO IMMINENT PTS CONDITION, the following may be used to evaluate.
	US	Announce transition to 1BwFR-P.1, RESPONSE TO IMMINEMT PTS CONDITION, and directs actions: • Get acknowledgements from RO and BOP. • Informs SM of plant status, evaluate for GSEP.
	RO/US	Determine RCS Pressure is < 325 psig and returns to procedure and Step in effect.
		Note: If the STA identifies a challenge to the Containment Status Tree and recommends transition to 1BwFR-Z.1 RESPONSE TO HIGH CONTAINMENT PRESSURE, the following may be used to evaluate.
	US	Announce transition to 1BwFR-Z.1, RESPONSE TO CONTAINMENT HIGH PRESSURE, and directs actions: • Get acknowledgements from RO and BOP. • Informs SM of plant status, evaluate for GSEP. • If 1BwCA 1.1 is in effect, then CS should be operated per 1BwCA-1.1 vice 1BwFR-Z.1.

	BOP	Performs actions of 1BwFR-Z.1, as directed:
		• Verify Cnmt Isolation Phase A – Group 3 CNMT Isol monitor lights Lit.
		• Verify Cnmt Ventilation Isolation -Group 6 CNMT Vent Isol monitor lights Lit.
		• Determine CS is required – Cnmt pressure had exceeded 20 psig.
		• Stop all RCPs
		• Verify Proper CS Emergency Alignment:
		  o 1CS001A or 1CS009A open
		  • 1CS001B or 1CS009B open
		  o 1CS007A open, manually open if necessary.
		  • 1CS007B open
		  • 1CS019A and B Not Open:
		    • Places CS pump test switch in Test
		    • Manually open 1CS019B
		    • Place CS pump test switch in Normal
		  • 1CS010B Open
		  • 1B CS Pump running (1A CS pump not running)
		  o Manually actuate CS and Phase B Isolation.

Comments: ____

Scenario No: 01-3		Event No. 6 and 7
Event Description:		1C RCP Seal leak worsens requiring Rx Trip, resulting in LBLOCA. Only one CS Train Available, Loss of Emergency Coolant Recirculation.
Time	Position	Applicant's Actions or Behavior
	BOP	Performs actions of 1BwFR-Z.1 as directed: • Verify Group 6 Phase B Isolation monitor lights Lit. • Check CS eductor flow on 1B CS pump < 15 gpm. • Check Cs eductor additive flow on 1B CS pump > 5 gpm. • Reset CS signal • Determine Spray additive tank LO-2 level lights are NOT lit. • Verify Group 2 RCFC Accident Mode status lights Lit. • Verify MSIV and Bypasses are all closed • Determine NO SG is faulted: • NO SG pressure decreasing uncontrollably, nor any SG completely depressurized.
	US	Returns to Procedure and step in effect.
		Scenario is complete at this point or at the Chief examiners discretion

Comments: ____

Simulation Facility	Braidwood	Scenario No.:	01-4	Operating Test No.: 1
Examiners:		Applicant:		SRO
				RO
				BOP

Initial Conditions: IC-16, 50% power, equilibrium xenon, steady state.

Turnover: A 60 gpd tube leak in 1D SG has been ongoing for 48 hrs. Steps 1-9 of 1BwOA SEC-8 are complete. Ongoing sample reports are due shortly after shift turnover. 1A MFP is unavailable. 1D SG PORV is isolated due to leakby. MESACs on 1A SGWLC instrumentation were completed last shift. The unit has been requested to ramp to full power.

Event No.	Malf. No.	Event Type*	Event Description
Preload	TH03D, .042 gpm SI12A SI01B Override	C RO SRO BOP C BOP C BOP C BOP	60 gpd tube leak 1D SG. 1A SI pump fails to Auto start, can be manually started. 1B SI pump fails to Auto and Manual start. 1D MSIV fails to manually close, can Auto close.
1	TH03D, 0.115 gpm	C SRO	Leak in 1D SG increases to > procedural limit requiring shutdown.
2		R RO SRO N BOP	Lower reactor power with boration and control rods. Ramp down turbine power form 50% to off line.
3	RX21A, 2500 TH11A, 100	I RO SRO C RO SRO	1PT-455 Controlling pressure Channel fails high, causing 1RY455 PZR PORV open and stick open.
4	CV01A	C RO SRO	1A CV pump trip.
5	FW16, 1500, 3 min ramp	I BOP SRO	Main Feed Header Pressure controller fails high, 1.5 min ramp.
6	EG03, 100	C BOP SRO	Main Generator Field Force – Auto Voltage Regulator Failure.
7	TH03D, 500, 5 min ramp	M BOP RO SRO	1D SG Tube leak increases to 500 gpm over 5 minutes.
8	MS03~~D~~, 100 H	~~M~~ BOP C SRO RO	Main steam safety valve on 1D SG fails open resulting in faulted ruptured SG.
9	SI 01B SI 12A	C C	1B SI pp fails to Auto and manually start 1A SI pp fails to Auto start, can be manually started

*(N)ormal, (R)eactivity (I)nstrument, (C)omponent, (M)ajor Transient

SCENARIO 01-4 OVERVIEW

The scenario begins with the unit at 50% power steady state. A report just after turnover confirms 165 gpd tube leakage in 1D S/G. This is an increase from 60 gpd at the beginning of last shift. Steps 1-9 of 1BwOA SEC-8, "STEAM GENERATOR TUBE LEAK" are complete. 1B SI pump will fail to start. 1A MFP is unavailable due to breaker cubicle work, and 1D S/G PORV is isolated due to leakby. MESACs on 1A SGWLC instrumentation were completed last shift.

The SRO will determine the unit must be shutdown within 2 hrs due to exceeding the procedural limit for tube leakage per 1BwOA SEC-8 SGTL, step 10. After clearly observable plant response to the reactivity change for shutting down, the controlling pressurizer pressure channel will fail high causing a PZR PORV to open and stick. The RO will diagnose the pressure channel failure and the PORV sticking open from alarms, meter indications, and decreasing PZR pressure. The RO will attempt to close the failed open PZR PORV, and then close its block valve to stop the pressure decrease. Manual action will also be required to close the PZR spray valves. The SRO will enter and direct actions from 1BwOA INST-2 Attachment B, "PRESSURIZER PRESSURE CHANNEL FAILURE," to select an operable channel, restore pressure, trip bistables and investigate Tech Specs. LCO 3.3.1 conditions E and K, LCO 3.3.2 condition D, LCO 3.3.4 condition A, and LCO 3.4.1 condition A apply for the failed instrument. Tech spec 3.4.11 applies for the Pzr PORV and power will be removed from the block valve. Maintenance will investigate as requested.

After the bistables are tripped for the failed pressure channel, the operating CV pump will trip. The RO will diagnose this failure from the annunciators, pump tripped indications, and a loss of charging flow. The SRO will enter and direct actions from 1BwOA PRI-15, "LOSS NORMAL CHARGING" to verify the tripped pump was not gas bound, start the standby charging pump, and investigate Tech Specs. LCO 3.5.2 condition A and TLCO 3.1.d apply. Maintenance will investigate as requested.

After swapping charging pumps, the Main Feed Header Pressure instrument will drift high causing the SG levels to decrease due to decreasing feed pump speed. The BOP will diagnose the failure from an increasing indication on MCB meter 1PI-508 and level deviation alarms for each SG, and restore main feed pump speed via manual control. The SRO will direct the actions based on the annunciator response procedure. Maintenance will investigate as requested.

After stabilizing feed flows, the automatic voltage regulator (AVR) will increase its output, overexciting the main generator. The BOP will diagnose this failure from main control board indications and alarms. The SRO will direct the BOP to take the regulator to OFF or TEST and reduce voltage to within acceptable limits per the annunciator response procedures. Maintenance will investigate as requested.

Shortly after the generator is stabilized, the tube leak on 1D SG will increase in severity to 500 gpm over 5 minutes. The RO will report decreasing pressurizer level, the BOP will report decreasing feed flow on 1D SG and water level stable or increasing. The MSL rad monitors will indicate increases. The SRO will determine PZR level can NOT be maintained, order a Reactor Trip and SI, and enter and direct response from 1BwEP-0, "REACTOR TRIP OR SAFETY INJECTION". The crew will perform Immediate and subsequent actions, diagnosing a SGTR in 1D S/G, and transition to 1BwEP-3 SGTR. The 1A SI pump will fail to start automatically but can be manually started. When an attempt is made to close the 1D MSIV, it will not close. The use of the MSIV Isolation switch will close all MSIVs. When the RH

Comments: ____

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pumps are stopped, a Main Steam Safety valve on 1D SG will fail open. The crew will diagnose the faulted ruptured steam generator by the decrease in steam generator pressure and transition to 1BwCA-3.1, "SGTR WITH LOSS OF REACTOR COLLANT – SUBCOOLED RECOVERY DESIRED." Initiation of further RCS cooldown will depend on the previous cooldown rate not exceeding 100 degrees F in any 1 hr. The scenario ends after the crew determines if a subcooled recovery is appropriate.

Critical Tasks

E-0—J: Establish flow from at least one intermediate head (SI) ECCS pump before transition out of E-0.

E-3—A: Isolate feed water flow into and steam flow out from the ruptured steam generator before a transition to ECA-3.1 occurs.

ECA-3.1—B: Cooldown the RCS to cold shutdown conditions at the highest rate achievable but less than 100 degrees F per hour in all RCS cold legs.

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SIMULATOR OPERATOR NOTES

Simulator Setup:
IC-16, 50% power, MOC, Xenon Equilibrium, steady state.
Align switches. Perform "Ready for Training" checklist.
Insert PRELOAD Events:
Take 1A MFP CS to PTL and hang tag.
Close 1MS019D. RF MS54 CLOSE. Put orange dot on 1D S/G Porv M/A station and Control Switch.
IMF TH03D.042 gpm (~ 60 gpd tube leak 1D S/G.)
IMF SI12A 1A SI pump fails to Auto Start, can be Manually started.
IOR ZDI1MS001D AUTO (override control switch for 1D MSIV to "AS IS" position forcing closure of ALL MSIVs.)
IMF SI01B 1B SI Pump fails to auto + manually start.

Event 1 Increase in tube leakage to greater than allowed by tech specs and procedures.
SDG:
Malf: TH03D, 0.115 gpm
NOTE: The minor increase in tube leakage in 1D SG is intended to cause the SRO to make a decision to shutdown based on exceeding allowable limits per Tech Specs and the procedure. A phone call from chemistry to the control room is necessary to report sample results confirm an increase in tube leakage to 165 gpd. (150 gpd is the limit.)
Initiate the event immediately after turnover or at the lead examiner's cue.
Acknowledge all info passed to the SM, WEC, and maintenance.

Event 2 Power reduction.

As SM, and Elec Ops acknowledge power reduction.
As Chemistry and RP acknowledge power reduction and requests for samples and RETS actions.

Event 3 Controlling PZR Pressure Channel fails high (2500 psig) causing PZR PORV to open and stick.
SDG: RX8
Trigger: When PORV 1RY 455 > 0, then IMF TH11A, 100.
Malf: RX21A, 2500
Initiate event after clearly observing reactivity change/response of plant to requested power ramp or at lead examiners cue.
Role play as U-2 admin and/or extra NSO to accomplish bistable tripping. Acknowledge all info passed to the SM, WEC, and maintenance.

SDG:
Cabinet door #1 open RF RX20 OPEN

Comments: ____________________

Pzr Press High Pressure Rx Trip	PB455A	C1-153	BS-1	RF	RX032 TRIP
Pzr Press Low Press Rx Trip	PB455C	C1-153	BS-4	RF	RX034 TRIP
Pzr Low Press SI	PB455D	C1-153	BS-3	RF	RX035 TRIP
P-11	PB455B	C1-153	BS-2	RF	RX033 TRIP
OTDT Rx Trip	TB411C	C1-124	BS-3	RF	RX013 TRIP
OTDT Runback	TB411D	C1-124	BS-4	RF	RX135 TRIP
Cabinet door #1 Close				RF	RX20 CLOSE

When requested to remove power from the block valve, 1RY8000A: RF ED058C OPEN.

Event 4 1A CV pump Trip.
SDG:
Malf: CV01A
Initiate event after actions for failed Pzr pressure control instruments and PORV are completed or at the lead examiners cue.
If sent to locally investigate the 1A CV pump and breaker, wait 3 minutes, perform first check, and report no apparent cause at the breaker (bus 141 cub___). If asked about 1A CV pump seal leakoff, report leakoff as "less than when it was running".
If sent to check the 1B CV pump, wait 3 minutes, perform first check, and report "normal operating conditions". If asked about seal leakoff, report "it looks about the same as when 1A CV pump runs".
Acknowledge all info passed to the SM, WEC, and maintenance.

Remote Starts or Stops of the Aux Lube Oil pumps can be accomplished by:
RF CV76

Event 5 Main Feed Header Pressure Controller (1PT-508) fails high over 3 minutes.
SDG:
Malf: FW16, 1500 psig, 1.5 minute ramp.
Initiate failure after tech specs are investigated for the CV pump trip, or at lead examiners cue.
Acknowledge all info passed to the SM, WEC, and maintenance.

Event 6 Main Generator Field Force – Auto voltage regulator failure, manual control available.
SDG:
Malf: EG03, 100
NOTE: Failure to take prompt action to reduce exciter field current will result in a generator trip reactor trip.
Initiate excitation problem after actions are taken to stabilize feed flow and SG levels, or at lead examiners cue.
Acknowledge all info passed to the SM, WEC, and maintenance.

Comments: ____________________

Event 7 SGTR 1D SG. Leakage increases to 500 gpm over 5 minutes.
SDG:
Malf: TH03D, 500 gpm, 5 minute ramp.
Initiate malfunction after actions are taken to manually control main generator exciter field current, or at lead examiners cue.
Acknowledge all info passed to the SM, WEC, and maintenance.
If requested to investigate failure of 1D MSIV report assistance is being called out.

3 minutes after steam is being dumped out of the SG Porvs for the cooldown, call the control room as Security, and report steam is visible coming out of the top of the applicable (1A and 1D; and/or 1B and 1C) MSIV room enclosures.

Event 8 Main Steam Safety Valves fails open.
SDG:
Malf: MS03~~D~~H, 100 MS03L, 100
Ensure the safety valve fails open when the RH pumps are stopped.
Trigger: When 1B RH pump CS is OFF, then IMF MS03~~D~~H 100.

If asked about steam flow from any MSIV room enclosures, there will be steam flow from the 1D SG when the safety opens, but you won't be able to tell specifically that the flow is from the 1D SG, just that there is flow from the top of the 1A and 1D enclosure. If steam is still being bled from the 1A, 1B and/or 1C SG Porvs, then if asked, report steam flow from the 1B and 1C room enclosure.

If asked, the H2 monitors can be placed in service on Low Scale by:
RF CH01 Low
RF CH06 Low

Comments: ______________________________

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Scenario No: 01-4	Event No. 1 and 2

Event Description: SGTL increases to greater than procedural limit and requires a shutdown of the unit be competed within 2 hrs.

Time	Position	Applicant's Actions or Behavior
	CUE	Report from chemistry indicating an increase in tube leakage from 60 to 165 gpd. Procedural direction from step 10 of 1BwOA SEC-8 SG Tube Leak to shutdown within 2 hrs.
	US	Determine Unit shutdown to mode 3 must be complete within 2 hrs/ Announce to RO and BOP: • Get acknowledgements from RO and BOP • Inform SM of plant status; evaluate GSEP. • Inform WEC of plant status. • Implement 1BwGP 100-4T3, "RAPID POWER REDUCTION FLOWCHART" and/or 1BwGP 100-4T2 Boration Dilution Boundary Calculation. • Contact Chemistry and HP for load change.
	RO/BOP	Perform actions as directed: • Review Precautions, Prerequisites, and Limitations and Actions of 1BwGP 100-4T3. • Initial flowchart. • Take RRD Data.

Comments: ____

Scenario No: 01-4		Event No. 1 and 2
Event Description:		SGTL increases to greater than procedural limit and requires a shutdown of the unit be competed within 2 hrs.
Time	Position	Applicant's Actions or Behavior
	RO	Verify rod position and boron concentration. Initiate boration, if required. (BwOP CV-6, Rev. 13.) • Determine required boric acid volume by: o Effects of previously performed borations o Braidwood Boration Dilution Tables • Determine required boric acid flow rate. • Set 1FK-110 BA Flow Cont to desired boration rate. • Set 1FY-0110 BA BlenderPreset Counter to desired volume. • Place MAKE-UP MODE CONT SWITCH to STOP position. • Set MU MODE SELECT to BOR position. • Place MAKE-UP MODE CONT Switch to START • Verify proper operation of valves and BA transfer pump (CV110B open, BA pump is running, CV110A throttles opens, BA flow on recorder. OR Batch addition: • Open CV110B. • Open CV110A. • Start BA Transfer pump. • When desired amount of BA added, stop BA Transfer pump. • Close CV110A o Flush BA line. • Close CV110B.
	BOP	Initiate turbine load reduction: • Depress LOAD RATE MW/MIN • Enter desired value for rate – 5MW/min • Depress REF • Enter power level 185 MW. • When ready to begin, depress GO. Verify load decreases.

Comments: ____

Scenario No: 01-4		Event No. 1 and 2
Event Description:		SGTL increases to greater than procedural limit and requires a shutdown of the unit be competed within 2 hrs.
Time	Position	Applicant's Actions or Behavior
	RO	Monitor power decrease: • Monitor reactor power, Tave, ΔI • Verify rods move in AUTO to maintain Tave within $\pm$ 1 degree F of Tref. If borating: • Monitor VCT level • Verify RCS boron concentration increasing • Monitor BA Blender counter • Verify boration auto stops at preset value. o Flush the BA line if desired. • Return Reactor Makeup System to blended flow at current blended flow. • If required to equalize boron concentration between the PZR and the loops, open PZR sprays by placing B/U HTR GRPS A/B/D Contactor Control Switch to the on position
		Note: Following clearly observable plant response from the reactivity changes, Event 3 is entered.

Comments: ____

Scenario No: 01-4		Event No. 3
Event Description:		Controlling Pressure Channel (1PT-455) fails high, causing PZR Porv 1RY455A to open and stick open, requiring closure of the Porv Block Valve, 1RY8000A.
Time	Position	Applicant's Actions or Behavior
	CUE	Annunciators: 1-12-B2 PZR PORV OR SAF VLV OPEN 1-12-C6 PZR PORV DSCH TEMP HIGH 1-12-D2 PZR PRESS CONT DEV HIGH Porv 1RY455A OPEN Position Indicating Light Lit. 1PI-455 Indicating 2500 psig. Decreasing PZR pressure
	RO/US	Diagnose/Announce PZR Pressure Transmitter failure and 1RY455A is open: • Verify PZR Pressure is decreasing and attempt to close 1RY455A. • Close Block Valve 1RY8000A. • Manually Close spray valves.
	US	Implement 1BwOA INST-2 "OPERATION WITH A FAILED CHANNEL", ATTACHMENT B, "PZR PRESSURE CHANNEL FAILURE", and direct actions: • Get acknowledgements from RO and BOP. • Inform SM of plant status, evaluate for GSEP. • Direct WEC to write AR, CR, and get maintenance involved. • Briefs Unit 1 NSO and Unit 2 Admin NSO on Bistable tripping.

Comments: ______________________________

Scenario No: 01-4		Event No. 3
Event Description:		Controlling Pressure Channel (1PT-455) fails high, causing PZR Porv 1RY455A to open and stick open, requiring closure of the Porv Block Valve, 1RY8000A.
Time	Position	Applicant's Actions or Behavior

	RO	Perform actions of 1BwOA INST-2 as directed:
		• Determine PZR Pressure NOT NORMAL, and take Manual Control to restore Pressure.
		• Determine Operable Channel NOT selected, Place the Master PZR Pressure Controller in Manual, Control PZR Pressure, and Select an Operable Channel.
		• Check PZR Porvs, Spray Valves and Heaters:
		  • PORVS Closed. If NOT, and PZR Pressure < 2315 psig, manually close PORV (1RY455A).
		  • When recognized that PORV 1RY455A won't Close, Close Block Valve 1RY8000A.
		  • PZR Spray Valves NORMAL. If not, then manually control.
		  • PZR Heaters NORMAL.
		• Check PZR Pressure Control In Auto:
		  • DOES NOT place 1RY455A in Auto.
		  • 1RY456 in Auto.
		  • Sprays in Auto (after operable channel selected for control).
		  • Master PZR Pressure Controller in Auto.
		• Select Operable Channels to Recorders:
		  • PZR Pressure.
		  • Loop DT.
		• Coordinates Bistable Tripping:
		  • Places colored dots on bistable, indications, and annunciators.
		  • Maintains communications with NSO tripping bistables.

	RO	Ensures the following Bistables are tripped: • PB455A • PB455C • PB455D • PB455B • TB411C • TB411D Checks PZR Pressure > 1930 psig and P-11 permissive is NOT Lit. (Bypass Permissive 3.3)

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Scenario No: 01-4		Event No. 3
Event Description:		Controlling Pressure Channel (1PT-455) fails high, causing PZR Porv 1RY455A to open and stick open, requiring closure of the Porv Block Valve, 1RY8000A.
Time	Position	Applicant's Actions or Behavior
	US	Refers to Tech Specs, and determines the following: • 3.3.1. Conditions E and K apply – Trip channel within 6 hrs. • 3.3.2 Condition D applies – Trip channel within 6 hrs. • 3.3.4 Condition A applies – Restore within 30 days • 3.4.1 Condition A applies – Restore DNB within 2 hrs. • 3.4.11. Condition B applies for PORV. Power needs to be removed from the Block Valve within 1 hr.
	BOP	Perform actions as directed: o Assist Unit NSO in monitoring panels and parameters. o Investigate BwARs. o Make phone calls as directed to WEC and maintenance. o Control load ramp o Coordinates removal of power from block valve 1RY8000A.
		Note: Following Tech Spec determination, initiate Event 4.

Comments: ______________________________

Scenario No: 01-4		Event No. 4
Event Description: 1A CV pump trip.		
Time	Position	Applicant's Actions or Behavior
	CUE	Annunciators: 1-9-A3 CHG PUMP TRIP 1-7-B2 RCP SEAL WTR INJ FLOW LOW Charging flow and seal injection flow decreasing to zero. Letdown Temperature increasing.
	RO/US	Diagnose/Announce Trip of 1A CV pump.
	US	Implement 1BwOA PRI-15, "LOSS OF NORMAL CHARGING" and direct actions: • Get acknowledgements from RO and BOP. • Inform SM of plant status and evaluate for GSEP. • Inform WEC, Write AR, CR, and get maintenance involved.

Comments: ____

Scenario No: 01-4		Event No. 4
Event Description: 1A CV pump trip.		
Time	Position	Applicant's Actions or Behavior

	RO	Perform actions as directed:
		• Determine NO CV pumps are operating.
		• Place 1A CV pump control Switch in Pull Out.
		• Isolate Letdown by closing 1CV8149A, B, and C.
		• Close 1CV459 and 1CV460.
		• Check VCT suction Valves Open 1CV112B and 1CV112C.
		• Maintain VCT level > 20 %.
		• Check VCT Temp HIGH (1-9-C2) NOT LIT.
		• Check for Gas Binding of 1A CV pump:
		  • RCP #1 Seal leakoff flow fluctuating on all RCPs prior to pump trip.
		  • CV pump flow trend fluctuating prior to pump trip. (Pt. F0128, or HMI group TR048)
		  • CV pump discharge Pressure Trend fluctuating prior to pump trip (Pt. P0103, or HMI group TR048).
		  • CV pump amps observed to be fluctuating prior to trip.
		• Determines 1A CV pump is NOT Gas bound.
		• Restore CV pump flow:
		  • Check 1CV8110 and 1CV8116 Open.
		  • Check RCS at NOP.
		  • Start 1B CV pump.
		• Check CV system Alignment:
		  • 1CV8146 or 1CV8147 Open
		  • 1CV8324A Open
		  • 1CV8105 and 1CV8106 open
		  • Charging flow established.

	RO	Check Normal Letdown Isolated.
	BOP	Perform actions as directed: • Dispatch operator to tripped pump and breaker to investigate cause. • Dispatch operator to Standby pump to check out start. • Trend group TR048 on HMI • Investigate BwARs

Comments: ____

Scenario No: 01-4		Event No. 4
Event Description: 1A CV pump trip.		
Time	Position	Applicant's Actions or Behavior

	RO/BOP	Restore letdown per 1BwOA ESP-2, "REESTABLISHING CV LETDOWN DURING ABNORMAL CONDITIONS":
		• Check Letdown Isolated – all 1CV8149 A, B, and C, Closed; 1CV459 and 1CV460 Closed.
		• Check Letdown Flowpath:
		  • 1CV8401A OPEN.
		  • 1CV8324A and 1CV8389A Open.
		  • 1CV8152 and 1CV8160 Open.
		  • BTRS Mode Selector Switch OFF light Lit.
		  • Place 1CV131 in Manual at 40% demand.
		  • Place 1CC130 Controller in Manual at 60% demand.
		  • Verify/Open 1CV8105 and 1CV8106.
		  • Throttle 1CV182 to maintain 8-13 gpm Seal injection flow per RCP.
		  • Throttle 1CV121 to establish at least 100 gpm charging flow.
		  • Open 1CV459 and 1CV460.
		  • Open Orifice Isolation valves 1CV8149A/B/C to establish desired letdown flow ($\leq$ 120 gpm).
		  • Adjust 1CV131 to control letdown pressure at ~360 psig.
		  • Adjust charging flow as necessary.
		  • Adjust 1CC130 to control letdown temperature between 90 and 115 degrees F.
		  • Place Controllers in Auto (1CV131, and 1CC130).
		  • Verify 1PR06J in Service.

	US TRM	Refer to Tech Specs: • 3.5.2 Condition A applies – 7 days to restore 3.1.b- applies but no entry • ~~TLCO~~ 3.1.d applies – 7 days to restore. • Return to procedure and step in effect (shutdown unit)
		• Request Risk assessment.
		NOTE: Once letdown is re-established, initiate EVENT 5.

Comments: ____

Scenario No: 01-4		Event No. 5
Event Description:		Main Feed header Pressure Controller (1PT-508) Fails High over 1.5 minute ramp.
Time	Position	Applicant's Actions or Behavior
	CUE	Annunciators: 1-15-A/B/C/D9 S/G 1A/B/C/D LEVEL DEVIATION HIGH LOW MFP pump speed decreasing. Feed Reg valves opening. SG levels decreasing Meter indication for 1PT-508 upscale.
	BOP/US	Diagnose/Announce failure of 1PT-508 and take manual control of the master feed pump speed controller to restore MFP speed.
	US	Direct actions to recover feed flow. • Inform SM of plant status and evaluate for GSEP. • Contact WEC to write AR, CR, and get maintenance involved.
	BOP	Perform actions as directed: • Take Feed Pump Master speed Controller to Manual • Increase Demand to speed up MFPs and recover SG levels. • Take Manual Control of Feed Reg valves as necessary to recover Feed flow. • Report actions to US.
	RO	Assist BOP as directed by US: o Investigate BwARs. o Assist with manual SG level restoration. • Monitor Reactor power and primary parameters.
		NOTE: After SG levels are stabilized, initiate event 6

Comments: ______________________________

Scenario No: 01-4		Event No. 6
Event Description:		Main Generator Field Forcing Alarm. Voltage Regulator Failure causing increased excitation of main generator.
Time	Position	Applicant's Actions or Behavior
	CUE	Annunciators: 1-19-C8 GENERATOR VOLT REG TROUBLE Exciter Field voltage increasing.
	BOP/US	Diagnose/Announce Generator Field Forcing Alarm.
	US	Direct actions for Generator Field Force Alarm. • Get acknowledgements from RO and BOP. • Inform SM of plant status and evaluate for GSEP. • Contact WEC for AR, CR, and maintenance. • Inform Bulk Power and OAD of Voltage Regulator failure. • Refer to figures 1BwGP 100-3A6 and 1BwGP 100-3A7 for MW and VAR limits.
	BOP	Perform actions as directed: • Report exciter field current is increasing. • Take Voltage Regulator to OFF. • Reduce exciter field current to < 100 amps by driving the base adjuster in the Lower direction.
	RO	Perform actions as directed: • Monitor reactor power and primary parameters. • Monitor secondary parameters as directed. • Investigate BwARs
		Note: After stabilizing the generator, initiate major accident sequence.

Comments: ____________________

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Scenario No: 01-4		Event No. 7 and 8
Event Description:		1D SG Tube Leak increases to 500 gpm (SGTR). 1A SI pump fails to auto start, 1D MSIV fails to Manually close, and subsequent MS safety opens on 1D SG.
Time	**Position**	**Applicant's Actions or Behavior**
	CUE	Annunciators: 1-15-D9 S/G 1D LEVEL DEVIATION HIGH LOW 1-12-B4 PZR LEVEL CONT DEV LOW Feed Flow decreasing on 1D SG, with constant or increasing level. RM-11 alarms. Decreasing PZR level. Steam Flow indication after MSIV closes on 1D SG
	BOP/US	Diagnose/Announce increasing leakage into 1D SG.
	US	Based on Operator Action Summary Page of 1BwOA SEC-8, "STEAM GENERATOR TUBE LEAK", orders Manual Reactor Trip and SI, implements 1BwEP-0, "REACTOR TRIP OR SI", and directs actions: • Get acknowledgements from RO and BOP. • Informs SM of plant status, evaluate for GSEP.

	RO	Performs Immediate Actions of 1BwEP-0, "REACTOR TRIP OR SI":
		• Verify Reactor Trip:
		  • Rod Bottom Lights ALL LIT.
		  • Reactor Trip and Bypass Breakers OPEN.
		  • Neutron Flux DECREASING.
		
		• Check SI Status:
		  o Determines PZR Pressure is decreasing abnormally
		  o Determines PZR level can NOT be maintained > 4%.
		  • Manually Actuates SI.

	BOP	Performs Immediate Actions of 1BwEP-0, "REACTOR TRIP OR SI":
		• Verify Turbine Trip:
		  • All Turbine throttle valves CLOSED.
		  • All Turbine governor valves CLOSED.
		
		• Verify Power to 4KV ESF Buses:
		  • Bus 141 ENERGIZED.
		  • Bus 142 ENERGIZED.

Comments: ____

Scenario No: 01-4		Event No. 7 and 8
Event Description:		1D SG Tube Leak increases to 500 gpm (SGTR). 1A SI pump fails to auto start, 1D MSIV fails to Manually close, and subsequent MS safety opens on 1D SG.
Time	Position	Applicant's Actions or Behavior

	BOP	Performs subsequent automatic actions of 1BwEP-0, as directed:
		• Verify FW Isolation:
		  • FW pumps TRIPPED.
		  • FW Isolation monitor lights LIT.
		  • FW pumps discharge valves (1FW002A, B, and C) CLOSED.
		
		• Verify RCFCs Running in Accident Mode:
		  • Group 2 RCFC Accident Mode status lights LIT.
		
		• Verify Cnmt Isolations:
		  • Cnmt Isolation Phase A:
		    • Group 3 CNMT Isol monitor lights LIT.
		  • Cnmt Ventilation Isolation:
		    • Group 6 CNMT Vent Isol monitor lights LIT.
		
		• Verify AF System:
		  • AF Pumps BOTH RUNNING.
		  • AF Isol valves (1AF013A-H) OPEN
		  • AF Flow Control valves (1AF005A-H) THROTTLED.
		
		• Verify CC Pumps BOTH RUNNING.
		
		• Verify SX Pumps BOTH RUNNING.
		
		• Determine MSIVs DO NOT need to be Closed:
		  • All SG Pressures > 640 psig.
		  • CNMT Pressure < 8.2 psig.
		
		• Determine CS DOES NOT need to be actuated:
		  • CNMT Pressure has remained < 20 psig.

	RW X 3-D	• Verify Total AF Flow:
		  • AF Flow > 500 gpm.
		  • Control feed flow to maintain narrow range level BETWEEN 10% and 50%.
		  • Determine 1D SG level INCREASING IN AN UNCONTOLLED MANNER:
		    • Identifies 1D SG as Ruptured, and CLOSES 1AF013D and 1AF013H.

Comments: ______________________________

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Scenario No: 01-4		Event No. 7 and 8
Event Description:		1D SG Tube Leak increases to 500 gpm (SGTR). 1A SI pump fails to auto start, 1D MSIV fails to Manually close, and subsequent MS safety opens on 1D SG.
Time	**Position**	**Applicant's Actions or Behavior**

	RO
	
	CT:
	E-0—J.
		Performs subsequent automatic actions of 1BwEP-0, as directed:
		• Verify ECCS Pumps Running:
		  • CV Pumps ONLY 1B RUNNING.
		  • SI Pumps:
		    • Determines NEITHER RUNNING, and MANUALLY STARTS 1A SI pump. (1B SI pump fails to start.)
		  • RH Pumps BOTH RUNNING
		o Reports pump failures to US.
		o Dispatches operators to investigate 1B SI pump and breaker.

	RO	Performs subsequent actions of 1BwEP-0, as directed:
		• Verify ECCS Valve Alignment:
		  • Group 2 Cold Leg Injection monitor lights LIT.
		
		• Verify ECCS Flow:
		  • High head SI Flow (1FI-917) > 100 gpm.
		  • IF RCS Pressure < 1700 psig (1PI-403A/405), THEN verify 1B SI Pump Discharge Flow (1FI-922) > 200 gpm.
		  o IF RCS Pressure < 325 psig, THEN verify RH Pump Discharge Flow (1FI-618/619) > 1000 gpm.
		
		• Check at Least One PZR PORV Relief Path Available:
		  • PORV Isol valves (1RY8000A and 1RY8000B) AT LEAST ONE ENERGIZED.
		  • PORV Relief Path AT LEAST ONE AVAILABLE:
		    • PORV in AUTO.
		    • Associated isol valve OPEN.

	BOP	Performs subsequent actions of 1BwEP-0, as directed:
		• Verify Generator Trip:
		  • Main Transformer output breakers (OCB1-8 and OCB7-8) OPEN.
		  • PMG Output Breaker OPEN.
		
		• Verify DGs Running:
		  • DGs BOTH RUNNING.
		  • DGs BOTH SX Cooling Valves (1SX169A and 1SX169B) OPEN.
		  • Dispatch operator to LOCALLY check operation.

Comments: ____

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Scenario No: 01-4		Event No. 7 and 8
Event Description:		1D SG Tube Leak increases to 500 gpm (SGTR). 1A SI pump fails to auto start, 1D MSIV fails to Manually close, and subsequent MS safety opens on 1D SG.
Time	Position	Applicant's Actions or Behavior
	BOP	Verify Control Room Ventilation Aligned for Emergency Operation: •Checks RM-11, Grid 2, 0PR31J-0PR34J < high alarm setpoint. •Checks operating VC train equipment running: • Supply fan • Return fan • M/U fan • Chilled Water pump • MCR Chiller •Checks Operating VC train dampers aligned: • M/U fan outlet damper (0VC024Y/0VC08Y) NOT FULLY CLOSED. • VC train M/U Filter Light Lit •Checks Operating VC Train Charcoal Absorber Aligned: • Bypass damper closed (0VC43Y/0VC44Y) • Inlet damper Open (0VC21Y/0VC05Y) • Outlet Damper Open (0VC22Y/0VC06Y) •Control Room pressure (MCR/TB DP, 0PDI-VC038) > +0.125" H2O.
	BOP	Verify Aux Bldg Ventilation Aligned for Emergency Operation: • Inaccessible Filter Plenums – Only TWO Aligned with Charcoal Absorbers On Line: o Plenum A: o Fan 0VA03CA Running with Flow Control Damper (0VA022Y) Open and Byp Isol Damper (0VA020Y) Closed. o Fan 0VA03CB Running with Flow Control Damper (0VA023Y) Open and Byp Isol Damper (0VA436Y) Closed. o Plenum B: o Fan 0VA03CC Running with Flow Control Damper (0VA024Y) Open and Byp Isol Damper (0VA021Y) Closed. o Fan 0VA03CD Running with Flow Control Damper (0VA025Y) Open and Byp Isol Damper (0VA437Y) Closed. o Plenum C: o Fan 0VA03CE Running with Flow Control Damper (0VA067Y) Open and Byp Isol Damper (0VA052Y) Closed. o Fan 0VA03CF Running with Flow Control Damper (0VA072Y) Open and Byp Isol Damper (0VA438Y) Closed.

Comments:

Scenario No: 01-4		Event No. 7 and 8
Event Description:		1D SG Tube Leak increases to 500 gpm (SGTR). 1A SI pump fails to auto start, 1D MSIV fails to Manually close, and subsequent MS safety opens on 1D SG.
Time	Position	Applicant's Actions or Behavior
	BOP	Verify FHB Ventilation Aligned for Emergency Operation: • FHB Charcoal Absorbers -One Train Aligned: o Train A: • Fan 0VA04CA Running • 0VA060Y Charcoal Absorber Inlet Isol Damper – Open. • 0VA057Y Filter Flow Control Damper – Open. • 0VA051Y Charcoal Absorber Bypass Isolation Damper – Closed. o Train B: • Fan 0VA04CB Running • 0VA055Y Charcoal Absorber Inlet Isol Damper – Open. • 0VA062Y Filter Flow Control Damper – Open. • 0VA435Y Charcoal Absorber Bypass Isolation Damper – Closed.
	RO	Check PZR Spray Valves and Porvs: • Spray valves (1RY455B and 1RY455C) Closed. • Porvs (1RY455A and 1RY456) Closed
		open but isolated
	RO	Maintain RCS Temperature Control: • With ANY RCPs running – RCS average temperature STABLE AT OR TRENDING TO 557 Degrees F. o Maintains > 500 gpm AF flow until at least one SG is 10% (31% Adverse).
	RO	Check RCP Status: • Determines RCPs RUNNING. • Check If RCPS should be Stopped: • ECCS Flow > 100 gpm on 1FI-917 or SI pump Flow > 200 gpm on 1FI-922. • RCS Pressure NOT LESS THAN 1425 psig. • DOES NOT STOP RCPs.
	BOP	Check Secondary Pressure Boundaries Intact: • NO SG Pressure DECREASING IN AN UNCONTROLLED MANNER. • NO SG COMPLETELY DEPRESSURIZED.

Comments: ______________________________

Scenario No: 01-4		Event No. 7 and 8
Event Description:		1D SG Tube Leak increases to 500 gpm (SGTR). 1A SI pump fails to auto start, 1D MSIV fails to Manually close, and subsequent MS safety opens on 1D SG.

Time	Position	Applicant's Actions or Behavior
	BOP	Check if SG Tubes are Intact: • SJAE/GS Exhaust Gas radiation (1PR27J) NOT LESS THAN ALERT ALARM SETPOINT. • SG Blowdown Liquid Radiation (1PR08J) NOT LESS THAN ALERT ALARM SETPOINT. • MS Line radiation (1RT-AR022 or 1RT-AR023) NOT LESS THAN ALERT ALRM SETPOINT. • Reports any of the above to US.
	US	Diagnoses/Announces SGTR, Transitions to 1BwEP-3, "SGTR", and directs actions: • Gets acknowledgement from RO and BOP. • Informs SM of plant status, and evaluates for GSEP. • Contacts WEC to have the STA commence monitoring Status Trees.

	RO	Performs actions of 1BwEP-3, "SGTR" as directed:
		• Check RCP Status:
		  • Determines RCPs RUNNING.
		  • Check If RCPS should be Stopped:
		    • ECCS Flow > 100 gpm on 1FI-917 or SI pump Flow > 200 gpm on 1FI-922.
		    • RCS Pressure NOT LESS THAN 1425 psig.
		  • DOES NOT STOP RCPs.

	BOP	Performs actions of 1BwEP-3, "SGTR", as directed:
		• Identify Ruptured SG fom any of the following means:
		  • Unexpected level rise in 1D SG.
		  • MS Line Rad 1D MSL/ MSIV room (4AD422/4AD423) NOT NORMAL FOR PLANT CONDITIONS.
		  • High Activity from 1D SG sample.

	BOP	Isolate Flow from 1D SG: o Verify 1D SG PORV Controller in AUTO. (SG 1D PORV is Isolated per turnover info) o WHEN 1D SG Pressure < 1115 psig, Verify 1D SG PORV (1MS018D) CLOSED. • Verify 1D SG Blowdown isolation valves (1SD002C and 1SD002D) CLOSED.
	BOP **CT:** **E-3—A.**	Isolate 1D SG Main Steam from at least one other SG: • Attempt Closure of 1MS001D (1D MSIV). • Report 1D MSIV did not CLOSE. • Actuate MSIV Isolation. • Report ALL MSIVs are CLOSED.

Comments: ____

Scenario No: 01-4		Event No. 7 and 8
Event Description:		1D SG Tube Leak increases to 500 gpm (SGTR). 1A SI pump fails to auto start, 1D MSIV fails to Manually close, and subsequent MS safety opens on 1D SG.
Time	**Position**	**Applicant's Actions or Behavior**
	US	Identifies successful isolation of 1D SG from at least 1 intact SG. Directs stabilization of RCS Temperature at 557 degrees F via steaming 1A, 1B, or 1C SGs.
	BOP	Performs subsequent actions of 1BwEP-3, "SGTR", as directed: • Determines 1A, 1B, and 1C SG PORVS are available for RCS COOLDOWN. • Determines 1D SG level is > 10% narrow range. • Verifies 1AF013D and 1AF013H are CLOSED. • Checks 1D SG Pressure > 320 psig.
	US	Directs actions of 1BwEP-3: • Determines required CETC temperature by obtaining 1D SG Pressure, Noting Normal Containment conditions, and selecting target temperature from table. (1100-1199 psig < 516 deg; 1000-1099 psig < 505 deg; 900-999 psig < 491 deg.)
	RO	Performs actions as directed: • Checks PZR Pressure: • WHEN PZR pressure < 1930, Verifies P-11 LIT, THEN Blocks both trains of Steam Line Isolation SI.

	BOP	Performs Actions as directed:
		~~• Initiates RCS Cooldown at MAXIMUM Rate from 1B SG.~~
		  ~~• Verifies Condenser Available (C-9) LIT.~~
		  ~~• Places MS Header pressure Controller in Manual at 0% demand.~~
		  ~~• Places Steam Dump Mode Selector Switch in STM PRESS Mode.~~
		  ~~• Adjusts MS header pressure controller in manual or auto to initiate cooldown.~~
		• Initiates RCS Cooldown at MAXIMUM Rate from 1A, 1B, ~~and~~ 1C SGs:
		  • Manually dumps steam from 1A and 1C SG by opening 1MS018A, 1MS018B, and 1MS018C (SG PORVS)
		
		• Stops Cooldown when Target RCS Temperature reached.
		• Maintains average of 10 highest CETCs < target temperature.

	US	Continues directing actions after RCS Cooldown is initiated while awaiting CETCs to reach the required RCS Temperature.

Comments: ____

Scenario No: 01-4		Event No. 7 and 8
Event Description:		1D SG Tube Leak increases to 500 gpm (SGTR). 1A SI pump fails to auto start, 1D MSIV fails to Manually close, and subsequent MS safety opens on 1D SG.
Time	Position	Applicant's Actions or Behavior
		Note: The MS safety on 1D SG will open when the step to stop RH pumps is reached.

	BOP	Performs actions as directed while RCS is Cooling down to Required Temperature:
		• Controls feed flow to maintain INTACT SGs Between 10% and 50% narrow range level.
		• Determines NO narrow range levels are increasing in an uncontrolled manner.
		• Reset CNMT Isolation signals:
		  • Phase A
		  o Phase B
		• Check SACs – ANY RUNNING.
		• Restore Instrument Air to CNMT –OPEN 1IA065 and 1IA066.
		• Verify All AC Buses Energized:
		  • Buses 141 and 142
		  • Buses 143 and 144
		  • Buses 156, 157, 158, and 159.
		
		• Determine RH pumps may be Stopped:
		  • RH pumps suction aligned to RWST.
		  • RCS Pressure > 325 psig.
		  • Stop RH pumps and place in Standby.

	RO	Performs actions as directed while RCS is Cooling down to Required Temperature: +150L
		• Checks PZR PORVs and Isolation valves:
		  • PZR PORV Isolation valves ENERGIZED and OPEN. Porv 455 open
		  • PZR PORVs CLOSED. Porv 456 closed
		
		• Reset SI:
		  • Depress Both SI Reset pushbuttons.
		  • Verify SI ACTUATED permissive light NOT LIT.
		  • Verify AUTO SI BLOCKED permissive light LIT.

	RO	Check if RCS Cooldown Should be Stopped: • Average of 10 highest CETCs < Required Temperature.
	BOP	Stop RCS Cooldown: • Maintain average of 10 highest CETCs < Required Temperature. o Notes/Reports steam flow on 1D SG. • Reports 1D SG pressure DECREASING.

Comments: ______________________________

Scenario No: 01-4		Event No. 7 and 8
Event Description:		1D SG Tube Leak increases to 500 gpm (SGTR). 1A SI pump fails to auto start, 1D MSIV fails to Manually close, and subsequent MS safety opens on 1D SG.
Time	Position	Applicant's Actions or Behavior
	US	Evaluates Decreasing 1D SG Pressure Trend/ BOP report of Steam Flow from 1D SG, and Transitions to 1BwCA-3.1, "SGTR WITH LOSS OF REACTOR COOLANT – SUBCOOLED RECOVERY DESIRED", and directs actions: • Gets acknowledgement from RO and BOP. • Informs SM of plant status, and evaluate for GSEP.
	RO/BOP:	Perform actions of 1BwCA-3.1 as directed: o Reset SI (Previously performed) o Reset Cnmt Isolations (Previously performed) o Verify all AC buses Energized (previously performed) • Check if CS should be stopped (CS is not initiated)
	BOP	Perform actions as directed: • Check ruptured SG (1D) Narrow Range level > 10%. • DOES NOT Initiate feed to 1D SG Level. • Reports RH pumps are already Stopped.

	BOP	Perform subsequent actions as directed to initiate plant status evaluation:
		• Check Aux Bldg Rad Trends for both Unit 1 and Unit 2 on RM-11 or HMI:
		  • Vent Stack effluent 1PR28J, 1PR30J, 2PR28J, 2PR30J.
		  • ECCS Pump Cubicles – 1PR13J through 1PR18J.
		  • Grid 4 Aux Bldg Area.
		• Place Hydrogen Monitors in service per BwOP PS-9, POST LOCA CNMT H2 MONITORING SYSTEM OPERATION.

Comments: ____

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Scenario No: 01-4		Event No. 7 and 8
Event Description:		1D SG Tube Leak increases to 500 gpm (SGTR). 1A SI pump fails to auto start, 1D MSIV fails to Manually close, and subsequent MS safety opens on 1D SG.
Time	**Position**	**Applicant's Actions or Behavior**

	US	Perform actions of 1BwCA-3.1:
		• Call Chemistry for samples:
		  • RCS Activity
		  • RCS Boron Concentration
		  • RCS Hydrogen Concentration
		  • Ruptured SG (1D) Activity
		  • Cnmt Atmosphere
		• Evaluate equipment needed in CC and RH systems to assist in plant recovery.

	US	Get Concurrence from SM that the Hydrogen Recombiners DO NOT need to be run.
	US	Determines that 1D SG pressure is decreasing in an uncontrolled manner and Transitions to 1BwEP-2, "FAULTED SG ISOLATION", and directs actions: • Gets acknowledgement from RO and BOP. • Informs SM of plant status, and GSEP evaluation.
		Note: Crew may decide that they have accomplished the Isolation of the Faulted 1D SG in accordance with 1BwEP-2, "FAULTED SG ISOLATION", without actually transitioning to 1BwEP-2. If they do go to 1BwEP-2, the procedure loop will eventually bring them back to 1BwCA-3.1.
	RO/BOP	Performs actions to Isolate 1D SG per 1BwEP-2 as directed: • Verifies MSIVs and Bypasses Closed, with MS Isolation Actuated. • Determines 1A, 1B, and 1C SGs are Intact, and 1D SG is Faulted • Verifies AF and main feed is Isolated to 1D SG. • Verifies 1D SG Porv CLOSED. • Verify 1D SG Blowdown Isolation and Sample valves are CLOSED. (1SD002's AND 1SD005's) • Confirms AF pump suction is adequate. • Confirms 1D SG is Ruptured.
	US	Transitions back to 1BwEP-3, "SGTR", and determines 1D SG Pressure will decrease to < 320 psig if it has not already. Transitions to 1BwCA-3.1, "SGTR with LOCA- SUBCOOLED RECOVERY DESIRED",and directs actions:

Comments: ____

Scenario No: 01-4		Event No. 7 and 8
Event Description:		1D SG Tube Leak increases to 500 gpm (SGTR). 1A SI pump fails to auto start, 1D MSIV fails to Manually close, and subsequent MS safety opens on 1D SG.
Time	Position	Applicant's Actions or Behavior
	BOP	Performs actions as directed to continue in 1BwCA-3.1: • Controls Intact SG levels between 10% and 50%. • Verifies NO INTACT SG level INCREASING IN AN UNCONTROLLED MANNER.
	RO **CT: CA3.1—B.**	Performs actions as directed to continue in 1BwCA-3.1: • Determines Cooldown in RCS Cold Legs is NOT LESS THAN 100 Degrees F in any 1 hr period. • DOES NOT Initiate any further Operator Controlled Cooldown of the RCS until the Cooldown rate in the RCS Cold Legs is < 100 degrees F in any 1 hr.
	BOP	Check if Subcooled Recovery is appropriate: • Determines RWST level is > 67%. • Determines 1D SG level < 93%
	RO/US	Checks RCS Subcooling: • Determines RCS Subcooling is acceptable by Iconic or Attachment A.
		Scenario is complete at this point or at the Chief examiners discretion

Comments: ____

INITIAL SUBMITTAL OF THE WRITTEN EXAMINATION

FOR THE BRAIDWOOD INITIAL EXAMINATION - OCTOBER 2001

Question Topic	CONDUCT OF OPERATIONS

The Tech Spec MINIMUM Staffing for BOTH units at power is:

	Unit Supv.	NSO
a.	2	3
b.	2	4
c.	1	3
d.	1	4

Answer	c	Exam Level	S	Cognitive Level	Memory	Facility:	Braidwood	ExamDate:	10/29/01

Tier:	Generic Knowledge and Abilities	RO Group	1	SRO Group	1

GENERIC			
2.1	Conduct of Operations		
2.1.4	Knowledge of shift staffing requirements.	2.3	3.4

Explanation of Answer	4 NSOs are desired, but not required. Only 1 US is required in the control room. A. B. D Incorrect. C. Correct

Reference Title	Facility Reference Number	Section	Page Number(s)	Revision	L. O.
Shift Staffing	BwAP 320-1	C.1	2	14	
Shift Staffing	BAP 320-1	C.1	2	12	
BwAP 320-1 Lesson Plan	I1-QB-XL-01				1

Material Required for Examination	None

Question Source:	Previous 2 NRC Exams	Question Modification Method:	Significantly Modified

Question Source Comments:	Braidwood 1999 NRC exam

Comment Type	Comment

Record Number:	1	RO Number:		SRO Number:	1

Question Topic CONDUCT OF OPERATIONS

Unit 1 is at 100% Reactor power.
If ALL DEHC feedback loops were IN SERVICE,
which ONE of the following will cause the license maximum power level to be exceeded?

a. RCS loop T hot RTD fails HIGH.

b. Turbine Impulse Pressure fails LOW.

c. Condenser Air Inleakage INCREASES.

d. Inadvertant Feedwater Isolation ACTUATION.

Answer c **Exam Level** S **Cognitive Level** Comprehension **Facility:** Braidwood **ExamDate:** 10/29/01

Tier: Generic Knowledge and Abilities **RO Group** 1 **SRO Group** 1

GENERIC

2.1 Conduct of Operations

2.1.7 Ability to evaluate plant performance and make operational judgments based on operating characteristics, reactor behavior, and instrument interpretation. 3.7 4.4

Explanation of Answer A. Incorrect, RTD failure will drive rods in adding negative reactivity. B. Incorrect, Pimp failing low will lower Tref, causing rods to drive in adding negative reactivity. C. Correct, less efficient secondary drops FW temperature, cooling off the RCS adding positive reactivity. D. Incorrect, a loss of feedwater will cause RCS temperature to increase, adding negative reactivity.

Reference Title	Facility Reference Number	Section	Page Number(s)	Revision	L. O.
Power Increase Procedure	1BwGP 100-3	E.3.h	10	21	
power Increase Procedure	1BGP 100-3	E.2.h	14	34	

Material Required for Examination None

Question Source: New **Question Modification Method:**

Question Source Comments:

Comment Type	Comment

Record Number: 2 **RO Number:** **SRO Number:** 2

Question Topic	CONDUCT OF OPERATIONS

The following conditions exist on Unit 1:

- Unit 1 is in MODE 2, performing a Reactor Startup.
- All Shutdown Banks are fully withdrawn.
- Control Bank A withdrawal has been stopped at 50 steps.
- Source Range Counts are STABLE.
- SDM is inadequate per the COLR.

What action is required?

a. RESTORE SDM within 15 minutes.

b. RESTORE SDM within 1 hour.

c. INITIATE Boration within 15 Minutes.

d. INITIATE Boration within 1 hour.

Answer	c	Exam Level	B	Cognitive Level	Memory	Facility:	Braidwood	ExamDate:	10/29/01

Tier:	Generic Knowledge and Abilities	RO Group	1	SRO Group	1

GENERIC			
2.1	Conduct of Operations		
2.1.11	Knowledge of less than one hour technical specification action statements for systems.	3.0	3.8

Explanation of Answer: Actions in the Tech Specs require initiation of boration within 15 minutes. The restoration of SDM is expected as a result of continued boration until it is restored. There is no requirement to restore SDM within 15 minutes, only initiate the action necessary to restore it. A. B. D. Incorrect. C. Correct.

Reference Title	Facility Reference Number	Section	Page Number(s)	Revision	L. O.
Improved Tech Specs	3.1.1. Action A		3.1.1-1	98	
Bases for ITS	B.3.1.1.	A.1	B.3.1.1-4	0	

Material Required for Examination	none

Question Source:	New	Question Modification Method:	

Question Source Comments:	

Comment Type	Comment

Record Number:	3	RO Number:	1	SRO Number:	3

Question Topic CONDUCT OF OPERATIONS

Unit 1 is at 100% Reactor power.

The following conditions exist with respect to the Unit 1 RWST:
- Level is 88%
- Boron is 2450 ppm
- Water Temperature is 45 degrees F.

The operators are required to . . .

a. INCREASE level to GREATER THAN OR EQUAL TO 89% within 1 hour.

b. DECREASE boron concentration to LESS THAN 2400 ppm within 7 days.

c. INCREASE water temperature to GREATER THAN OR EQUAL TO 65 degrees F within 24 hours.

d. Take NO ACTION with respect to the RWST parameters.

Answer a **Exam Level** S **Cognitive Level** Application **Facility:** Braidwood **ExamDate:** 10/29/01

Tier: Generic Knowledge and Abilities **RO Group** 1 **SRO Group** 1

GENERIC

2.1 Conduct of Operations

2.1.12 Ability to apply technical specifications for a system. 2.9 4.0

Explanation of Answer A. Correct. B. Incorrect, Boron is ok, answer is plausible. C. Incorrect, water temp is ok. D. Incorrect, level is out of spec.

Reference Title	Facility Reference Number	Section	Page Number(s)	Revision	L. O.
ch specs	3.5.4 RWST		3.5.4-1,2	98	

Material Required for Examination none

Question Source: New **Question Modification Method:**

Question Source Comments:

Comment Type	Comment

Record Number: 4 **RO Number:** **SRO Number:** 4

Question Topic	CONDUCT OF OPERATIONS

The following conditons exist on Unit 1:

- Unit is in MODE 3 after a loss of offsite power.
- The Control Room was evacuated due to a fire.
- The Remote Shutdown Panel is manned.

Using equipment controlled from the Remote Shutdown Panel, which ONE of the following is used to maintain RCS pressure control?

a. Aux spray; PZR heater groups A and B.

b. Aux spray; PZR heater group C.

c. Normal spray; PZR heater groups A and B.

d. Normal spray; PZR heater group C.

Answer	a	Exam Level	R	Cognitive Level	Memory	Facility:	Braidwood	ExamDate:	10/29/01

Tier:	Generic Knowledge and Abilities	RO Group	1	SRO Group	1

GENERIC			
2.1	Conduct of Operations		
2.1.30	Ability to locate and operate components, including local controls.	3.9	3.4

Explanation of Answer: A. Correct. B. and D. Incorrect. There are no controls at the remote shutdown panel for heater group C. C. And D Incorrect. A loss of offsite power means the RCPs are off, therefore there is no normal spray.

Reference Title	Facility Reference Number	Section	Page Number(s)	Revision	L. O.
·orse Notes- Remote shudown Panel	PN-1 RSP	1PL06J		3	
Remote Shutdowon Panel	I1-RS-XL-01	II.A.1.b.2)	7	1	4
Control Room Inaccesability	1BwOA PRI-5, 1BOA PRI-5	Step 23, Step 3 Att.A	27, 42	100, 100	

Material Required for Examination	none

Question Source:	Previous 2 NRC Exams	Question Modification Method:	Concept Used

Question Source Comments:	1999 Braidwod NRC Exam

Comment Type	Comment

Record Number:	5	RO Number:	2	SRO Number:	

Question Topic CONDUCT OF OPERATIONS

With the unit in mode 1,
which ONE of the following would require LCO entry?

a. RCS Tave at 594 degrees F.

b. Pressurizer Pressure at 2215 psig.

c. Containment Pressure at 0.85 psig.

d. Pressurizer Level at 72%.

Answer a **Exam Level** R **Cognitive Level** Memory **Facility:** Braidwood **ExamDate:** 10/29/01

Tier: Generic Knowledge and Abilities **RO Group** 1 **SRO Group** 1

GENERIC

2.1 Conduct of Operations

2.1.33 Ability to recognize indications for system operating parameters which are entry-level conditions for technical specifications. 3.4 4.0

Explanation of Answer A. Correct per the reference. B. Incorrect, Pressure can be as low as 2209 psig. C. Incorrect, Cnmt pressure can be as high as 1.0 psig. D. Incorrect, Pressurize level can be as high as 92%.

Reference Title	Facility Reference Number	Section	Page Number(s)	Revision	L. O.
COLR	2.12.2		14		

Material Required for Examination none

Question Source: New **Question Modification Method:**

Question Source Comments:

Comment Type	Comment

Record Number: 6 **RO Number:** 3 **SRO Number:**

Question Topic EQUIPMENT CONTROL

The following conditions exist on Unit 1:

- MODE 3 at Normal Operating Temperature and Pressure, preparing for Reactor Startup.
- The RCS has been diluted to the ECC Startup Boron concentration.
- Letdown Temperature Control valve controller, TCV 1CC-130A is in MANUAL.
- All other controls are in AUTOMATIC and functioning NORMALLY.

If the operator REDUCES letdown flow from 120 gpm to 75 gpm with NO other manipulations, over time, Source Range counts will . . .

a. INCREASE due to cooler water exiting the letdown heat exchanger.

b. INCREASE due to warmer water exiting the letdown heat exchanger.

c. DECREASE due to cooler water exiting the letdown heat exchanger.

d. DECREASE due to warmer water exiting the letdown heat exchanger.

Answer a **Exam Level** B **Cognitive Level** Comprehension **Facility:** Braidwood **ExamDate:** 10/29/01

Tier: Generic Knowledge and Abilities **RO Group** 1 **SRO Group** 1

GENERIC

2.2 Equipment Control

2.2.1 Ability to perform pre-startup procedures for the facility, including operating those controls associated with plant equipment that could affect reactivity. 3.7 3.6

Explanation of Answer A. Correct. With less letdown flow through the letdown heat exchanger and constant component cooling flow, the letdown flow will be cooler as it enters the mixed bed demineralizer. The cooler water will cause the resins to exchange monoborate ions into the letdown flow stream for tri borate ions. This reduces the number of boron atoms in the flow causing a dilution and adding positve reactivity. Source Range counts will increase. B. Incorrect, the letdown flow will not be warmer. C. Incorrect, SR Counts will increase. D. Incorrect, SR counts will increase, and letdown flow will be cooler, not warmer.

Reference Title	Facility Reference Number	Section	Page Number(s)	Revision	L. O.
CVCS lesson plan ch 15a	I1-CV-XL-01	II.A.1.h.5)	8	2	5
Mixed Bed Demineralizer Operations	BwOP CV-8, BOP CV-8	D.1, D.1	2, 2	14, 27	

Material Required for Examination none

Question Source: New **Question Modification Method:**

Question Source Comments:

Comment Type	Comment

Record Number: 7 **RO Number:** 4 **SRO Number:** 5

Question Topic	EQUIPMENT CONTROL

Unit 2 is in Mode 3.

A new system engineer has requested that the 2A SI pump be started with the discharge valve throttled to 75% open to determine starting current.

The evolution is NOT described in current procedures, nor the Safety Analysis Report.

The Shift Manager may . . .

a. Approve the evolution without restrictions.

b. Only approve the test if another SRO with an engineering degree agrees.

c. Not approve the test until a written safety evaluation has been performed and approved.

d. Not approve the test under any conditions.

Answer	Exam Level	Cognitive Level	Facility:	ExamDate:
c	S	Memory	Braidwood	10/29/01

Tier:	RO Group	SRO Group
Generic Knowledge and Abilities	1	1

GENERIC			
2.2	Equipment Control		
2.2.10	Knowledge of the process for determining if the margin of safety, as defined in the basis of any technical specification is reduced by a proposed change, test or experiment.	1.9	3.3

Explanation of Answer: A. Incorrect. B. Incorrect. C. Correct. The activity involves a test not specified in the SAR, so has not been reviewed for safety issues. Therefore the correct action is to perform and review a safety evaluation. D. Incorrect.

Reference Title	Facility Reference Number	Section	Page Number(s)	Revision	L.O.
Safety Evaluation process	LS-AA-999	A.1.0	5	0	

Material Required for Examination	none

Question Source:	Other Facility	Question Modification Method:	Editorially Modified

Question Source Comments:	1999 LaSalle NRC exam

Comment Type	Comment

Record Number:	8	RO Number:		SRO Number:	6

Question Topic EQUIPMENT CONTROL

Which ONE of the following "FIN Team" maintenance activities require Post Maintenance Testing to meet OPERABILITY requirements for a Containment Isolation valve?

a. Adjust packing.

b. Replace OPEN Indication light socket.

c. Tighten air line connection to operator.

d. Remove insulation from valve.

Answer a **Exam Level** S **Cognitive Level** Memory **Facility:** Braidwood **ExamDate:** 10/29/01

Tier: Generic Knowledge and Abilities **RO Group** 1 **SRO Group** 1

GENERIC

2.2 Equipment Control

2.2.21 Knowledge of pre- and post-maintenance operability requirements. 2.3 3.5

Explanation of Answer A. Correct. B, C, D Incorrect no requirement to perform post maintenance testing exists for these activities. Adjusting the packing has the potential to affect the isolation stroke time, therefore must be tested.

Reference Title	Facility Reference Number	Section	Page Number(s)	Revision	L. O.
Post maintenance testing program	WC-AA-105	Attachment 1	11	3	

Material Required for Examination none

Question Source: New **Question Modification Method:**

Question Source Comments:

Comment Type	Comment

Record Number: 9 **RO Number:** **SRO Number:** 7

Question Topic	EQUIPMENT CONTROL

Which ONE of the following is the HIGHEST RCS pressure listed without exceeding the Safety Limit?

a. 2650 psig.

b. 2700 psig.

c. 2750 psig.

d. 2800 psig.

Answer	b	Exam Level	B	Cognitive Level	Memory	Facility:	Braidwood	ExamDate:	10/29/01

Tier:	Generic Knowledge and Abilities	RO Group	1	SRO Group	1

GENERIC			
2.2	Equipment Control		
2.2.22	Knowledge of limiting conditions for operations and safety limits.	3.4	4.1

Explanation of Answer: Per the reference, the limit is 2735 psig. Of the choices, the highest pressure that is less than 2735 psig is 2700 psig.

Reference Title	Facility Reference Number	Section	Page Number(s)	Revision	L. O.
Tech Specs	safety Limits	2.1.2	2.0-1	113	
Intro to Tech spec lesson plan ch 3	I1-MC-XL-13	III	12,13		3a

Material Required for Examination	none

Question Source:	New	Question Modification Method:	

Question Source Comments:	

Comment Type	Comment

Record Number:	10	RO Number:	5	SRO Number:	8

Question Topic	EQUIPMENT CONTROL

The PREFERRED method of Reactor Cavity Fill from just below the reactor vessel flange to the Refueling level (424'6") is via . . .

a. An SI pump through the RCS Cold Legs.

b. Gravity Drain of the RWST through the RCS Hot Legs.

c. An RH pump through the RCS Hot Legs.

d. SI Accumulator dump through the RCS Cold Legs.

Answer	Exam Level	Cognitive Level	Facility:	ExamDate:
c	B	Memory	Braidwood	10/29/01

Tier:	RO Group	SRO Group
Generic Knowledge and Abilities	1	1

GENERIC			
2.2	Equipment Control		
2.2.27	Knowledge of the refueling process.	2.6	3.5

Explanation of Answer

Although each method is physically possible, the reference prefers the RH pump to the hot leg to mimimize clarity problems and radiological issues. A. Incorrect. SI pumps are not used, they are OOS. B. Incorrect. Gravity drain is the method to fill to just below the flange (i.e. first step). C. Correct. RH pump though the hot leg is preferred. D. Incorrect. SI accumulator dump is not used for filling cavity, although is part of the ECCS testing that is peformed during outages.

Reference Title	Facility Reference Number	Section	Page Number(s)	Revision	L. O.
Filling the Rx Cavity for Refueling	BwOP RH-8	E.7, and F.1 Note	4,6	13	
Filling the Rx cavity for Refueling	BOP RH-8	F.1.k note	7	15	

Material Required for Examination	None

Question Source:	Question Modification Method:
New	

Question Source Comments:

Comment Type	Comment

Record Number:	RO Number:	SRO Number:
11	6	9

Question Topic	RADIOLOGICAL CONTROLS

Given the following information for a rad worker qualified operator:

- Age — 25 yrs.
- Total Lifetime exposure — 3800 mrem TEDE
- Current Year exposure — 800 mrem TEDE

A Site Area Emergency has been declared due to a LOCA Outside Containment with limited makeup to the RWST available.
The above operator volunteers to make an emergency entry into the penetration area to attempt to isolate the leak.
This action would result in a significant reduction in offsite dose.
The individual has all the required approvals.

What is the MAXIMUM exposure the operator may receive while performing this action?

a. 1200 mrem TEDE.

b. 4200 mrem TEDE.

c. 24200 mrem TEDE.

d. 25000 mrem TEDE.

Answer:	d	Exam Level	B	Cognitive Level	Application	Facility:	Braidwood	ExamDate:	10/29/01

Tier:	Generic Knowledge and Abilities	RO Group	1	SRO Group	1

GENERIC

3 Radiation Control

2.3.1	Knowledge of 10 CFR: 20 and related facility radiation control requirements.	2.6	3.0

Explanation of Answer: Emergency exposure limit for lifesaving or protection of large populations is 25 REM TEDE. This limit is for the individual event in progress. The current exposure history is NOT used in determining the exposure limit (but is used in determining the acceptability of the individual). C. Incorrect. If the current exposure was included, then the maximum limit would be 24200 mrem (25000-800). The NRC exposure limit is for 5000 mrem/year for routine operations. B. Incorrect. If the NRC limit for routine exposure was applicable, then 4200 mrem (5000-800) would be the limit. Exelon provides for normal routine administrative exposure control level of 2000 mrem routine TEDE/year (site exposure). A. Incorrect. If admin limits were applicable, then 1200 (2000-800) would apply for the year since this is the margin left prior to emergency entry.

Reference Title	Facility Reference Number	Section	Page Number(s)	Revision	L. O.
Exposure Review and Authorization	RP-AA-203	4.5.3	8	1	
Selected Rp procedures	I1-AM-XL-46	III.F.7	58	0	3, 4, 5
Exposure Review /Authorization	BwRP-5300-2	G.7	19	4	

Material Required for Examination	None
Question Source:	Previous 2 NRC Exams
Question Modification Method:	Concept Used
Question Source Comments:	Braidwood 1999 NRC exam

Comment Type	Comment

Record Number:	12	RO Number:	7	SRO Number:	10

Question Topic RADIOLOGICAL CONTROLS

A Non-Licensed operator's exposure on shift has reached 2000 mrem TEDE for the current year. A h requires an estimated 50 mrem exposure for today.

To receive today's additional exposure the operator must get the approval of the . . .

a. Operations Manager and a Health Physics Supervisor.

b. Operations Manager and the Rad Protection Manager.

c. Rad Protection Manager and the Dose Assessment Health Physicist.

d. Rad Protection Manager and the Station Manager.

Answer	b	**Exam Level**	S	**Cognitive Level**	Memory	**Facility:**	Braidwood	**ExamDate:**	10/29/01

Tier: Generic Knowledge and Abilities **RO Group** 1 **SRO Group** 1

GENERIC			
2.3	Radiation Control		
2.3.2	Knowledge of facility ALARA program.	2.5	2.9

Explanation of Answer B. Correct. To exceed 2000 mrem TEDE by 50 mrem, the approval of the department manager and the RP manager is required. A. C. D. Incorrect. Other combinations are required for higher exposure authorizations.

Reference Title	Facility Reference Number	Section	Page Number(s)	Revision	L. O.
Annual Administrative Exposure Control Level Extension apparoval	RP-AA-203	Attachment 2	11	1	
BwRP-5300-2	I1-AM-XL-46			4	2

Material Required for Examination None

Question Source: Other Facility **Question Modification Method:** Editorially Modified

Question Source Comments: 2001 Seabrook NRC exam

Comment Type	Comment

Record Number: 13 **RO Number:** **SRO Number:** 11

Question Topic	RADIOLOGICAL CONTROLS

Which ONE of the following is an SRO responsibility?

a. Placing the placard "Gas Decay Tank Release in Progress" on 0PM02J prior to commencing a release.

b. Performing second verification of the lineup to transfer a blowdown tank to the condensate storage tank.

c. Determining the release rate for a gas decay tank release.

d. Performing second verification of the lineup to place a release tank on recirculation.

Answer	Exam Level	Cognitive Level	Facility:	ExamDate:
a	S	Memory	Braidwood	10/29/01

Tier:	RO Group	SRO Group
Generic Knowledge and Abilities	1	1

GENERIC			
2.3	Radiation Control		
2.3.3	Knowledge of SRO responsibilities for auxiliary systems that are outside the control room (e.g., waste disposal and handling systems).	1.8	2.9

Explanation of Answer: A. Correct. Per the reference, the SRO or (SM) has the responsibility to place the placard on 2J. B. C. D. Incorrect. None of the other activities require an SRO to perform the activity or the verification.

Reference Title	Facility Reference Number	Section	Page Number(s)	Revision	L. O.
Waste Gas Decay Tank Release Form	BwOP GW-500T1	E.1	16	12	
Gaseous Effluent Release form WG DT	BCP 400-TWASTE GAS	E.1	7	13	

Material Required for Examination	none

Question Source:	New	Question Modification Method:	

Question Source Comments:	

Comment Type	Comment

Record Number:	14	RO Number:		SRO Number:	12

Question Topic	RADIOLOGICAL CONTROLS

Which ONE of the following can provide final authorization for a Liquid Rad Waste release?

a. Plant Manager.

b. Shift Manager.

c. Rad Protection Supervisor.

d. Chemistry Supervisor.

Answer	b	Exam Level	S	Cognitive Level	Memory	Facility:	Braidwood	ExamDate:	10/29/01

Tier:	Generic Knowledge and Abilities	RO Group	1	SRO Group	1

GENERIC			
2.3	Radiation Control		
2.3.6	Knowledge of the requirements for reviewing and approving release permits.	2.1	3.1

Explanation of Answer	Per reference, the only correct answer is B. A. Incorrect, Plant Manager does not have license. C. D. Incorrect, their signaturess are on the form but not as final approval.

Reference Title	Facility Reference Number	Section	Page Number(s)	Revision	L. O.
Liquid Radwaste Release tank Release Form	BwOP WX-501T1	F.4	30	15	
Liquid Radwaste Release Form for release Tank 0WX01T	BCP 400-TWX01	G.5	19	20	
Liquid radwaste Release Form for Release tank 0WX026T	BCP 400-TWX26	G.5	20	21	

Material Required for Examination	None

Question Source:	New	Question Modification Method:	

Question Source Comments:	

Comment Type	Comment

Record Number:	15	RO Number:		SRO Number:	13

Question Topic	RADIOLOGICAL CONTROLS

The following conditions exist on Unit 1:

- 100% Reactor power.
- Containment Purge is in progress using Mini-Purge Supply and Exhaust Fans.

While the purge is in progress, 1RE-PR001, Containment Purge Effluent Rad monitor, exceeds the ALERT setpoint.

Which ONE of the following should the operator verify?

a. MANUALLY stop the containment purge.

b. Ensure containment purge AUTOMATICALLY stops.

c. Ensure Post-LOCA Purge filter unit AUTOMATICALLY aligns.

d. MANUALLY align Post LOCA Purge filter unit.

Answer	a	Exam Level	R	Cognitive Level	Memory	Facility:	Braidwood	ExamDate:	10/29/01

Tier:	Generic Knowledge and Abilities	RO Group	1	SRO Group	1

GENERIC			
2.3	Radiation Control		
2.3.9	Knowledge of the process for performing a containment purge.	2.5	3.4

Explanation of Answer: A. Correct. B. Incorrect, the AR011/12 auto isolates the purge path, not the 1RE-PR001. C. Incorrect, there is no auto alignment of the post loca purge filter unit. D. Incorrect, procedure reference directs stopping purge (vice manually aligning filter unit).

Reference Title	Facility Reference Number	Section	Page Number(s)	Revision	L. O.
Containment Mini-Purge System Operation	BwOP VQ-6	E.5	2	12	
Containment Min-Purge System Operation	BOP VQ-6	E.2	2	5	
Cnmt Vent lesson plan ch 42	I1-VP-XL-01				9

Material Required for Examination	None

Question Source:	New	Question Modification Method:	

Question Source Comments:	

Comment Type	Comment

Record Number:	16	RO Number:	8	SRO Number:	

Question Topic	RADIOLOGICAL CONTROLS

The following conditons exist at the site:

- Approximately 15 minutes ago a radiation release occurred at the site.
- A Control Room Ventilation Isolation Signal was AUTOMATICALLY Actuated.
- The crew is checking the Control Room Ventilation Alignment per procedures.

If the Control Room Ventilation Systems have properly re-aligned, the Control Room Pressure is . . .

a. EQUAL TO outside air pressure.

b. GREATER THAN air pressure in the adjacent areas.

c. LESS THAN outside air pressure.

d. LESS THAN air pressure in the adjacent areas.

Answer	b	Exam Level	R	Cognitive Level	Memory	Facility:	Braidwood	ExamDate:	10/29/01

Tier:	Generic Knowledge and Abilities	RO Group	1	SRO Group	1

GENERIC			
2.3	Radiation Control		
2.3.10	Ability to perform procedures to reduce excessive levels of radiation and guard against personnel exposure.	2.9	3.3

Explanation of Answer: B. Correct. Upon high rad signal, the Control Room Vent system starts the make up fan, opens the turbine building intake, isolates the normal intake from outside, isolates purge path if open, and puts the recirc charcoal absorber online. Flow capacity is such that the Control room is pressurized to greater than or equal to 0.125 inches water gauge above adjacent areas. A. Incorrect. C. D. Incorrect. With pressure in the control room envelope less than surrounding areas, inleakage would be possible.

Reference Title	Facility Reference Number	Section	Page Number(s)	Revision	L. O.
VC Filtration system	B 3.7.10		B.3.7.10-2	0	
Control Room HVAC ch 43B	I1-VC-XL-01			1	8,13

Material Required for Examination	None

Question Source:	Other Facility	Question Modification Method:	Concept Used

Question Source Comments:	2000 Milstone NRC exam

Comment Type	Comment

Record Number:	17	RO Number:	9	SRO Number:	

Question Topic	RADIOLOGICAL CONTROLS

The following conditons exist on Unit 1:

- 100% Reactor power.
- VCT level is 50%.
- VCT pressure is 18 psig.
- Spent Fuel Pool cooling is aligned to Unit 1.
- Unit '0' CC Heat Exchanger is in standby.
- Excess Letdown is ON LINE, due to a Letdown Orifice Block valve (1CV8149A) problem.
- Component Cooling Water Surge Tank level is slowly INCREASING.

In order to MINIMIZE further contamination of the Component Cooling Water system, consideration should be given to . . .

a. Swapping Spent Fuel Pool Heat Exchangers.

b. Aligning the Unit '0' CC Heat exchanger to Unit 1, and Isolating the Unit 1 CC Heat Exchanger.

c. Isolating the Seal Water Heat Exchanger.

d. Isolating the Excess Letdown Heat Exchangers.

Answer	Exam Level	Cognitive Level	Facility:	ExamDate:
d	R	Memory	Braidwood	10/29/01

Tier:	RO Group	SRO Group
Generic Knowledge and Abilities	1	1

GENERIC			
2.3	Radiation Control		
2.3.11	Ability to control radiation releases.	2.7	3.2

Explanation of Answer

An increase in the CC surge tank is possible when the system being cooled is at a greater pressure than the CC system. Normal CC system pressure is ~135-145 psig. A. Incorrect, a leak in the SFP Hxs would be outleakage from the CC system, therefore swapping those Hxs would not minimize further contamination of the CC system. B. Incorrect, SX is at a lower pressure than CC, therefore placing the '0' CC Hx on line and isolating the Unit 1 hx would not minimize further contamination either. C. Incorrect, at the given pressures and conditions, the Seal Water Hx is an outleakage source too. D. Correct, CC pressure is less than the excess letdown pressure. This would be an Inleakage source to the CC system. Isolating excess letdown would minimize further contamination of the CC system.

Reference Title	Facility Reference Number	Section	Page Number(s)	Revision	L. O.
Component Cooling malfunction	1BwOA PRI-6	Symptoms, and Att. B	1, 25-30	100	

Material Required for Examination	none

Question Source:	New	Question Modification Method:	

Question Source Comments:	

Comment Type	Comment

Record Number:	RO Number:	SRO Number:
18	10	

Question Topic	EMERGENCY PROCEDURES/PLAN

Given the following initial conditions on Unit 1:

- MODE 3 operations were in progress after a normal shutdown and cooldown in accordance with all procedures.
- RCS Pressure was manually depressurized to 900 psig.
- RCS was being cooled down by dumping steam to the condenser at 50 degrees F per hr.
- SI Accumulators were ISOLATED as pressure was reduced below 1000 psig.

A few minutes ago a Containment Area Rad monitor alarmed. The crew noted the following:

- PZR Level is DECREASING.
- Letdown is ISOLATED.
- Charging flow is 150 gpm.

Actions to mitigate this situation are contained in . . .

a. 1BwOA PRI-1 EXCESSIVE PRIMARY PLANT LEAKAGE.

b. 1BwOA S/D-2 SHUTDOWN LOCA.

c. 1BwOA SEC-4 LOSS OF INSTRUMENT AIR.

d. 1BwOA PRI-10 LOSS OF RH COOLING.

Answer	b	Exam Level	S	Cognitive Level	Application	Facility:	Braidwood	ExamDate:	10/29/01

Tier:	Generic Knowledge and Abilities	RO Group	1	SRO Group	1

:ENERIC			
2.4	Emergency Procedures / Plan		
2.4.11	Knowledge of abnormal condition procedures.	3.4	3.6

Explanation of Answer: PRI-1 manually isolates letdown is step 1, then evaluates charging flow. If charging flow > 120gpm, kick out to S/D-2. A Loss of IA wll isolate letdown, but not cause PZR level to decrease. The loss of RH cooling procedure does have an entry condition for decreasing PZR level, but is not used in Mode 3. The only correct answer is B.

Reference Title	Facility Reference Number	Section	Page Number(s)	Revision	L. O.
Shutdown LOCA	1BwOA S/D-2, 1BOA S/D-2	A., B., A.B	1,1	51A,100	
Excessive Primary Plant Leakage	1BwOA Pri-1, 1BOA-PRI-1	Step 2, Step 2	3,3	55,100	
S/D-2 lesson plan	I1-OA-XL-35			2	2

Material Required for Examination	None

Question Source:	New	Question Modification Method:	

Question Source Comments:	

Comment Type	Comment

:cord Number:	19	RO Number:		SRO Number:	14

Question Topic	EMERGENCY PROCEDURES/PLAN

A Fire is reported on the 401' Turbine Building Trackway.

XCLUDING the Fire Chief, which ONE of the following describes the MINIMUM number of Fire Brigade members and the REASON for their INITIAL reporting location?

a. 4, to pickup their personal protection equipment and portable fire fighting equipment.

b. 4, to assess the extent of the fire and identify the portable fire fighting equipment needed.

c. 5, to pickup their personal protection equipment and portable fire fighting equipment.

d. 5, to assess the extent of the fire and identify the portable fire fighting equipment needed.

Answer	Exam Level	Cognitive Level	Facility:	ExamDate:
a	B	Application	Braidwood	10/29/01

Tier:	RO Group	SRO Group
Generic Knowledge and Abilities	1	1

GENERIC			
2.4	Emergency Procedures / Plan		
2.4.26	Knowledge of facility protection requirements including fire brigade and portable fire fighting equipment usage.	2.9	3.3

Explanation of Answer

A. Correct. Per the reference, the fire chief goes to the fire, but the brigade reports to the equipment cage. The chief sizes up the fire and determines the equipment the brigade needs to bring. Per the note, 4 members besides the chief are on the brigade. B. Incorrect, the members initially report to the cage, not the fire. C. and D. Incorrect, wrong number of members.

Reference Title	Facility Reference Number	Section	Page Number(s)	Revision	L.O.
Fire Dept Response, Notification, and mutual d agreements and Expected Chain of Events During a Fire	BwAP 1100-5	Note and C.5.f, h	3-5	7	
Response Procedure for Fire	BAP 1100-10	C.3.a.1), 4)	6,7	3	
Admin procedures	I1-QB-XL-03			5	3,4

Material Required for Examination	none

Question Source:	Question Modification Method:
New	

Question Source Comments:	

Comment Type	Comment

Record Number:	RO Number:	SRO Number:
20	11	15

Question Topic EMERGENCY PROCEDURES/PLAN

During an emergency situation, the 1B AFW pump failed to start in AUTO or MANUAL from the main control room.

...) what Auxiliary Building Elevation should a team be dispatched to attempt a LOCAL start of the 1B Auxiliary Feedwater pump?

a. 383' level.

b. 401' level.

c. 426' level.

d. 451' level.

Answer a **Exam Level** B **Cognitive Level** Memory **Facility:** Braidwood **ExamDate:** 10/29/01

Tier: Generic Knowledge and Abilities **RO Group** 1 **SRO Group** 1

GENERIC

2.4 Emergency Procedures / Plan

2.4.34 Knowledge of RO tasks performed outside the main control room during emergency operations including system geography and system implications. 3.8 3.6

Explanation of Answer A. Correct. The 1B AFW pump local controls are on the 383' level (the 364' level does have an separate control used for when problems exist with the suction pressure transmitter, or a fire has occurred). The 364' level was not used as a distractor to prevent ambiguity in this question. B. C. and D. Incorrect,, wrong elevation.

Reference Title	Facility Reference Number	Section	Page Number(s)	Revision	L. O.
Reactor Trip Response	1BwEP ES 0.1	step 3.d	5	1A WOG 1C	
General Arrangements Dwgs					
Local Emerg Control of Safe S/D Equip	1BOA ELEC-5	Att. D	11-13	53B	

Material Required for Examination None

Question Source: New **Question Modification Method:**

Question Source Comments:

Comment Type	Comment

Record Number: 21 **RO Number:** 12 **SRO Number:** 16

Question Topic EMERGENCY PROCEDURES/PLAN

The following time line of events occurred on Unit 1:

- 1000 PZR Level started decreasing.
- 1001 SJAE/GS Exhauster Radiation level alarm.
- 1005 Reactor Trip/ Manual Safety Injection.
- 1010 Event Classified as ALERT (FA1) 1A SGTR.

In order to meet the notification requirements for NARS, the INITIAL notification to the State and Local agencies must be made NOT LATER THAN . . .

a. 1015.

b. 1016.

c. 1020.

d. 1025.

Answer d **Exam Level** R **Cognitive Level** Application **Facility:** Braidwood **ExamDate:** 10/29/01

Tier: Generic Knowledge and Abilities **RO Group** 1 **SRO Group** 1

GENERIC

2.4 Emergency Procedures / Plan

2.4.39 Knowledge of the RO's responsibilities in emergency plan implementation. 3.3 3.1

Explanation of Answer A. B. C Incorrect. D. Correct. Per the reference, a 15 minute time limit from the time of event classification applies. The distractors are all 15 minutes from the given time line values, however, the correct point at which to start the 15 minute clock is from the time of classification.

Reference Title	Facility Reference Number	Section	Page Number(s)	Revision	L. O.
Notifications	EP-AA-114	4.1.1.1	2	0	

Material Required for Examination none

Question Source: New **Question Modification Method:**

Question Source Comments:

Comment Type	Comment

Record Number: 22 **RO Number:** 13 **SRO Number:**

Question Topic EMERGENCY PROCEDURES/PLAN

A Unit 1 trip and Safety Injection has occurred due to a Steam Generator Fault inside containment.

The following conditions exist:

- All automatic equipment responded as expected.
- Containment Pressure is 3.2 psig and slowly INCREASING.
- RCS Pressure is 1750 psig and STABLE.
- RCS Subcooling margin is 105 degrees F and INCREASING.
- Pressurizer level is 22% and INCREASING.
- Affected SG Level is 8% wide range.
- Both AFW pumps are operating.
- Unaffected SG Levels are being controlled at 40% Narrow Range.

Assuming trends continue, in which ONE of the following procedures would you expect to STOP 1 CV pump?

a. 1BwEP-2 Faulted SG Isolation.

b. 1BwEP-1 Loss of Reactor or Secondary Coolant.

c. 1BwEP ES-1.2 Post LOCA Cooldown and Depressurization.

d. 1BwEP ES-1.1 SI Termination.

Answer d **Exam Level** S **Cognitive Level** Application **Facility:** Braidwood **ExamDate:** 10/29/01

Tier: Generic Knowledge and Abilities **RO Group** 1 **SRO Group** 1

ENERIC

2.4 Emergency Procedures / Plan

2.4.48 Ability to interpret control room indications to verify the status and operation of system, and understand how operator actions and directives affect plant and system conditions. 3.5 3.8

Explanation of Answer A. Incorrect, there are no steps to stop ECCS pumps in E-2. B. Incorrect, The only pumps stopped in E-1 are the RH pumps. C. Incorrect, conditons will not transition the crew to ES-1.2. D. Correct, Stopping CV pump is directed in ES-1.1.

Reference Title	Facility Reference Number	Section	Page Number(s)	Revision	L. O.
SI Termination	1BwEP ES-1.1	Step 3	4	1A WOG 1C	
SI Termination	1BEP ES-1.1	Step 3	3	100 WOG 1C	

Material Required for Examination None

Question Source: Other Facility **Question Modification Method:** Concept Used

Question Source Comments: 2001 Seabrook SRO NRC Exam.

Comment Type	Comment

Record Number:	23	RO Number:		SRO Number:	17

Question Topic CONTROL ROD DRIVE SYSTEM

nit 1 was at 100% Reactor power when a Differential Overcurrent Trip occurred on the Main Generator.

PREDICT the impact on the Control Rod Drive System (CRDS) and IDENTIFY the action required to be performed by the operator.

Predicted Impact on the Reactor Trip Breakers	Required Operator Action
a. OPEN	VERIFY Turbine Trip.
b. OPEN	VERIFY ECCS pumps running.
c. CLOSED	VERIFY 6.9 Bus ABT.
d. CLOSED	VERIFY DGs started.

Answer	a	Exam Level	B	Cognitive Level	Memory	Facility:	Braidwood	ExamDate:	10/29/01

Tier:	Plant Systems	RO Group	1	SRO Group	1

001	Control Rod Drive System		
A2.	Ability to (a) predict the impacts of the following on the Control Rod Drive System and (b) based on those predictions, use procedures to correct, control, or mitigate the consequences of those abnormal operation:		
A2.07	Effect of reactor trip on primary and secondary parameters and systems	4.1	4.4

Explanation of Answer A. Correct, loss of Main Generator trips the turbine. Turbine Trip causes Reactor Trip, all rods insert. Immediate action of reactor trip procedure is to verify turbine trip. B. Incorrect, no SI will occur. C. and D. Incorrect, Reactor Trips, even though ABT action will occur. DGs don't get a start signal.

Reference Title	Facility Reference Number	Section	Page Number(s)	Revision	L. O.
Alarm Response Procedures	BwAR 1-19-A1, BAR 1-19-A1	, B.1	,1		
Alarm Response Procedures	BwAR 1-19-E2, BAR 1-19-A1	B.1,B.1	1,1		

Material Required for Examination none

Question Source: New **Question Modification Method:**

Question Source Comments:

Comment Type	Comment

Record Number:	24	RO Number:	14	SRO Number:	18

Question Topic	CONTROLROD DRIVE SYSTEM

The following conditions exist on Unit 2:

- 80% Reactor power and ramping UP at 5 MW per minute.
- Tave and Tref are matched.
- Rod Control is in AUTOMATIC.

ONE Minute later:

- DRPI Indication for Control Bank D Rod D-12 is 180 steps.
- All Other Control Bank D Rods are indicating 216 Steps.

With NO Operator action taken, the DEMAND for rod motion will be ___(1)___, and the trend in Delta I for the channel nearest the rod problem will be to become ___(2)___.

	ROD MOTION	DELTA I TREND
a.	INWARD	LESS NEGATIVE
b.	INWARD	MORE NEGATIVE
c.	OUTWARD	LESS NEGATIVE
d.	OUTWARD	MORE NEGATIVE

Answer:	d	Exam Level	B	Cognitive Level	Comprehension	Facility:	Braidwood	ExamDate:	10/29/01

Tier:	Plant Systems	RO Group	1	SRO Group	1
001	Control Rod Drive System				
A3.	Ability to monitor automatic operations of the Control Rod Drive System including:				
A3.04	Radial imbalance			3.5	3.8

Explanation of Answer: D. Correct. The sudden partial insertion of a rod will affect the nearest Power Range channel. The insertion of negative reactivity will depress flux in the area of the rod (tip) causing the power produced current from the top half of the excore detector to become less. The bottom half is not affected by the partial insertion. Delta I = I top - I bottom. With I top smaller, delta I gets more negative. The insertion of negative reactivity reduces Tave when steam demand and T ref are increasing due to the ramp. The mismatch will demand outward rod motion, although an urgent failure may prevent the actual motion.

Reference Title	Facility Reference Number	Section	Page Number(s)	Revision	L. O.
Power Distribution	Power Distribution 2	equations		1	
Abnormal Proc Dropped Rod	1BwOA ROD-3	B	1	100	
	I1-OA-XL-34				1,6

Material Required for Examination	None
Question Source:	New
Question Modification Method:	
Question Source Comments:	

Comment Type	Comment

Record Number:	25	RO Number:	15	SRO Number:	19

Question Topic: RCS

/ith the Reactor at 100% power on Unit 2,
Which ONE of the following will REDUCE RCS Subcooling?

a. Turn ON ALL Pressurizer Heaters.

b. OPEN a Pressurizer PORV.

c. DECREASE Reactor power.

d. CLOSE Pressurizer Sprays.

Answer	b	Exam Level	B	Cognitive Level	Memory	Facility:	Braidwood	ExamDate:	10/29/01

Tier:	Plant Systems	RO Group	2	SRO Group	2

002	Reactor Coolant System		
K5.	Knowledge of the operational implications of the following concepts as they apply to the Reactor Coolant System:		
K5.09	Relationship of pressure and temperature for water at saturation and subcooling conditions	3.7	4.2

Explanation of Answer: Any action that would decrease pressure or increase temperature at constant pressure will decrease subcooling. A. Incorrect, pressure will rise slightly until sprays compensate, subcooling will remain the same. B. Correct, an open Pzr Porv will rapidly decrease pressure and subcooling, heaters will not keep up. C Incorrect, reducing power reduces Tave, and initially increases pressure. D. Incorrect, pressure will increase, increasing subcooling.

Reference Title	Facility Reference Number	Section	Page Number(s)	Revision	L. O.
Steam Tables					
ıermo lesson plan ch 2	I1-TH-xl-02				2

Material Required for Examination: none

Question Source: New **Question Modification Method:**

Question Source Comments:

Comment Type	Comment

Record Number:	26	RO Number:	16	SRO Number:	20

Question Topic	RCP

Simultaneous faults on BOTH ESF Buses at 100% Power requires . . .

a. A Reactor Trip because there is NO charging flow to replace letdown.

b. A Controlled Shutdown because the Charging pump will overheat without Essential Service Water cooling flow.

c. A Controlled Shutdown because the RCP seals will overheat without charging flow.

d. A Reactor Trip because the RCP motors will overheat without component cooling flow.

Answer	d	Exam Level	R	Cognitive Level	Memory	Facility:	Braidwood	ExamDate:	10/29/01

Tier:	Plant Systems	RO Group	1	SRO Group	1

003	Reactor Coolant Pump System		
K2.	Knowledge of bus power supplies to the following:		
K2.02	CCW pumps	2.5*	2.6*

Explanation of Answer: A loss of both ESF buses, results in NO CCW flow to the RCP motor bearings. D. Correct. A Trip is necessary, vice a controlled shutdown because of the potential for damage to the RCP. The seals may eventually overheat without charging flow, but the immediate threat is to the motor bearings. A. Incorrect. Although charging flow is interrupted, letdown can be isolated, therefore the reason is incorrect. B. and C. Incorrect, a trip is necessary, not a controlled shutdown.

Reference Title	Facility Reference Number	Section	Page Number(s)	Revision	L. O.
Component Cooling malfunction	1BwOA PRI-6	Att A. step 1	10	100	
Component Cooling malfunction	1BOA PRI-6	Att. A step 1.e	10	100	

Material Required for Examination	None

Question Source:	New	Question Modification Method:	

Question Source Comments:	

Comment Type	Comment

Record Number:	27	RO Number:	17	SRO Number:	

Question Topic CVCS

Given the following conditions on Unit 1:

- 100% Reactor power.
- Chemical analyses of the RCS indicate INCREASING RCS Activity.
- Gross Failed Fuel rad monitor (1PR006J) indicates an INCREASING trend.
- CVCS Letdown flow is 75 gpm.

Which ONE of the following actions are directed by the applicable Abnormal Operating Procedure?

a. MAXIMIZE letdown flow.

b. MAINTAIN present letdown flowrate and place the STANDBY Mixed Bed Demineralizer in service.

c. MAINTAIN present letdown flowrate and place the Cation Demineralizer in service.

d. MINIMIZE letdown flow.

Answer a **Exam Level** R **Cognitive Level** Memory **Facility:** Braidwood **ExamDate:** 10/29/01

Tier: Plant Systems **RO Group** 1 **SRO Group** 1

004	Chemical and Volume Control System		
2.3	Radiation Control		
2.3.10	Ability to perform procedures to reduce excessive levels of radiation and guard against personnel exposure.	2.9	3.3

Explanation of Answer A. Correct per reference. B. Incorrect, maximize letdown to cleanup RCS, no info given to prompt a swap to the standby mixed bed demin. C. Incorrect, Maximize letdown for cleanup, no direction to place Cation demin on line. D. Incorrect, maximize letdown.

Reference Title	Facility Reference Number	Section	Page Number(s)	Revision	L. O.
High RCS Activity	1BwOA PRI-4	Step 3	2	54a	
Abnormal Primary chemistry	1BOA PRI-4	Step 4	2	100	

Material Required for Examination none

Question Source: Other Facility **Question Modification Method:** Editorially Modified

Question Source Comments: South Texas NRC exam 1998

Comment Type	Comment

Record Number: 28 **RO Number:** 18 **SRO Number:**

Question Topic	CVCS

The lineup for placing the Unit 1 Boric Acid Storage Tank on RECIRCULATION using the Unit 1 Boric Acid Transfer pump is complete.
The Unit 1 Boric Acid Transfer Pump filter is plugged .

Taking the Boric Acid Transfer Pump Control Switch to "START" would . . .

a. Result in the Unit 1 Boric Acid Pump operating against a shutoff head.

b. Result in additional recirculation flow of the Unit 2 Boric Acid Storage Tank.

c. Prevent the discharge of Unit 2 Boric Acid Tank contents to the Unit 2 blender.

d. Damage the Unit 1 Boric Acid Pump due to operating with no suction.

Answer	a	Exam Level	B	Cognitive Level	Application	Facility:	Braidwood	ExamDate:	10/29/01

Tier:	Plant Systems	RO Group	1	SRO Group	1

004	Chemical and Volume Control System		
K6.	Knowledge of the effect of a loss or malfunction on the following will have on the Chemical and Volume Control System:		
K6.10	Boric acid storage tank/boron injection tank recirculation flow path	2.7	3.1

Explanation of Answer: The recirc alignment in the premise goes through the filter, and isolates the normal recirc alignment that bypasses the filter. Therefore, when manually starting the pump with the filter plugged, there is no discharge flowpath. The normal flow control valves in the reactor makeup control system are normally closed, and are not affected by a manual start of the pump. A. Correct. B. Incorrect, this alignment does not affect recirc flow to the Unit 2 BAST. C. Incorrect, Unit 2 BAST can still be discharged to the Unit 2 blender. D. Incorrect, there is still a suction flowpath.

Reference Title	Facility Reference Number	Section	Page Number(s)	Revision	L. O.
Recircing a Boric Acid Tank.	BwOP AB-10, BOP AB-6	Step F.3, F.3	5, 6, 9,10	14,15	
Fundamental pump concepts					
P and ID	M-65 sheet 5a			BD	

Material Required for Examination	none

Question Source:	New	Question Modification Method:	

Question Source Comments:	

Comment Type	Comment

Record Number:	29	RO Number:	19	SRO Number:	21

Question Topic RHR

Given the following conditions on Unit 1:

- MODE 4 during heatup per 1BwGP 100-1.
- RCS is in a solid plant condtion.
- 1B RH pump is operating in Shutdown Cooling mode.
- RCS Temperature is 300 degrees F and Stable.
- RCS Pressure is being AUTOMATICALLY controlled at 340 psig.

A failure of the letdown pressure control valve controller 1PK-131 causes RCS pressure to rise to 515 psig, with 1B RH pump discharge pressure of 625 psig.

In response to this transient, ___(1)___, will OPEN, and
the operator should take MANUAL control of 1PK-131 and ___(2)___ to reduce pressure.

	(1)	(2)
a.	ONLY the RH Loop Suction Relief,	INCREASE demand
b.	ONLY the RH Loop Suction Relief,	DECREASE demand
c.	the RH Loop Suction Relief and RH Discharge Relief,	DECREASE demand
d.	the RH Loop Suction Relief and RH Loop Discharge Relief,	INCREASE demand

Answer d **Exam Level** B **Cognitive Level** Comprehension **Facility:** Braidwood **ExamDate:** 10/29/01

Tier: Plant Systems **RO Group** 3 **SRO Group** 3

	Residual Heat Removal System
A2.	Ability to (a) predict the impacts of the following on the Residual Heat Removal System and (b) based on those predictions, use procedures to correct, control, or mitigate the consequences of those abnormal operation:
A2.02	Pressure transient protection during cold shutdown — 3.5 / 3.7

Explanation of Answer RHR suction relief valves are set to open at 450 psig. The RHR discharge reliefs are set to open at 600 psig. D. Correct. Actual discharge pressure reached 625 psig. Increasing demand on 131 will open the valve and lower pressure to reseat the relief valves. A. and B. Incorrect, the discharge reliefs will open. C. Incorrect, demand on 131 must be increased.

Reference Title	Facility Reference Number	Section	Page Number(s)	Revision	L. O.
RHR sys desc. Ch 18	ch 18		19,20,25	5	
Horse Notes Ch 18	RH-1 RHR Cooldown			3	
Residual Heat Removal System Ch 18	I1-RH-XL-01	II.A.5 and 9	9	7	4e, f, and 11

Material Required for Examination None

Question Source: New **Question Modification Method:**

Question Source Comments:

Comment Type	Comment

Record Number:	30	RO Number:	20	SRO Number:	22

Question Topic	RHR

Unit 1 is entering a refueling outage.
It is desired to take 1A RH train out of service as soon as possible to start work on the 1A RH pump and heat exchanger.
The 1B RH train is operable and operating in the shutdown cooling mode.

The earliest the 1A RH train may be taken out of service is when the reactor vessel internals are removed and water level is GREATER THAN or EQUAL TO 23 feet above the . . .

a. Fuel to limit rad dose at the surface of the cavity.

b. Reactor vessel flange to provide backup decay heat removal.

c. Fuel to provide backup decay heat removal.

d. Reactor vessel flange to limit rad dose at the surface of the cavity.

Answer	b	Exam Level	S	Cognitive Level	Memory	Facility:	Braidwood	ExamDate:	10/29/01

Tier:	Plant Systems	RO Group	3	SRO Group	3

	Residual Heat Removal System		
2.2	Equipment Control		
2.2.27	Knowledge of the refueling process.	2.6	3.5

Explanation of Answer	B. Correct. Combination of water and internals removed is stated in the reference.

Reference Title	Facility Reference Number	Section	Page Number(s)	Revision	L. O.
Tech Spec Bases	B 3.9.5		B 3.9.5-2	0	
RHR system desc	ch18			5	8

Material Required for Examination	None

Question Source:	New	Question Modification Method:	

Question Source Comments:	

Comment Type	Comment

Record Number:	31	RO Number:		SRO Number:	23

Question Topic	ECCS

BOTH Braidwood Units undergo LOCA transients.
All equipment in BOTH Units operate as designed.
BOTH Units implement appropriate procedures.
The RWST level for each Unit is 65%.

Unit 1 RCS Pressure is 50 psig and STEADY.
Unit 2 RCS Pressure is 650 psig and STEADY.

Currently . . .

a. SI and RH pump amps are near their MAXIMUM on Unit 2.

b. CV and RH pump amps are near their MINIMUM on Unit 2.

c. CV and SI pump amps are near their MINIMUM on Unit 1.

d. CV and RH pumps amps are near their MAXIMUM on Unit 1.

Answer	d	Exam Level	R	Cognitive Level	Application	Facility:	Braidwood	ExamDate:	10/29/01

Tier:	Plant Systems	RO Group	2	SRO Group	2

006	Emergency Core Cooling System		
A1.	Ability to predict and/or monitor changes in parameters associated with operating the Emergency Core Cooling System controls including:		
A1.09	Pump amperage, including start, normal and locked	2.8	3.2

Explanation of Answer: CV pumps capacity 550 gpm at 650 psig = max amps. SI pumps capacity 650 gpm at 800 psig = max amps. RH pumps capacity 5000 gpm at 125 psig = max amps. A. Incorrect, SI pumps are at max, but RH pumps are at min due to pressure. B. Incorrect, RH pumps are at min, but CV pumps are at max. C. Incorrect, CV and SI pumps are at max. D. Correct.

Reference Title	Facility Reference Number	Section	Page Number(s)	Revision	L. O.
Horse Notes ch 58 ECCS	ECCS-1 ECCS System	Pumps		5	
Pump theory Fluid Flow ch 2	I1-FF-XL-02				1,2,4,5, 15
ECCs lessonplan ch 58	I1-CE-XL-01			1	3

Material Required for Examination	None

Question Source:	New	Question Modification Method:	

Question Source Comments:	

Comment Type	Comment

Record Number:	32	RO Number:	21	SRO Number:	

Question Topic	ECCS

During recovery from a Large Break LOCA, a LOSS of which ONE of the following pumps will have the GREATEST impact on LONG TERM CORE COOLING?

a. Reactor Coolant Pumps.

b. Residual Heat Removal Pumps.

c. Safety Injection Pumps.

d. Centrifugal Charging Pumps.

Answer	b	Exam Level	R	Cognitive Level	Application	Facility:	Braidwood	ExamDate:	10/29/01

Tier:	Plant Systems	RO Group	2	SRO Group	2

006	Emergency Core Cooling System		
K6.	Knowledge of the effect of a loss or malfunction on the following will have on the Emergency Core Cooling System:		
K6.13	Pumps	2.6	2.9

Explanation of Answer: A. Incorrect. For any LOCA a loss of offsite power is assumed, therefore the RCPs are not necessary for long term cooling. C. and D. Incorrect. Although the CV and SI pumps play a role in core cooling, without the RHR pumps to recirculate the water from the containment sump to the core and the suction of the SI and CV pumps, insufficient decay heat would be removed. B. Correct.

Reference Title	Facility Reference Number	Section	Page Number(s)	Revision	L. O.
Horse Notes ECCS	ECCS-3	Design Basis		0	
ECCs lesson plan ch 58	I1-CE-XL-01	I.D		1	2

Material Required for Examination: None

Question Source: New **Question Modification Method:**

Question Source Comments:

Comment Type	Comment

Record Number: 33 **RO Number:** 22 **SRO Number:**

Question Topic	PRT

Which ONE of the following RELIEF VALVES discharge to the Pressurizer Relief Tank?

a. Charging Pump Discharge Relief Valve.

b. Letdown Line Relief Valve.

c. RCP Thermal Barrier Relief Valve.

d. RH Pump Discharge Relief Valve.

Answer	b	Exam Level	R	Cognitive Level	Memory	Facility:	Braidwood	ExamDate:	10/29/01

Tier:	Plant Systems	RO Group	3	SRO Group	3

007	Pressurizer Relief Tank/Quench Tank System		
A3.	Ability to monitor automatic operations of the Pressurizer Relief Tank/Quench Tank System including:		
A3.01	Components which discharge to the PRT	2.7*	2.9

Explanation of Answer	A. Incorrect, CV pump reliefs discharge to the VCT. B. Correct. C. Incorrect, RCP Thermal barrier relief goes to the cnmt floor. D. Incorrect, RH pump discharge relief goes to the HUT.

Reference Title	Facility Reference Number	Section	Page Number(s)	Revision	L. O.
P and ID	M-64 sheet 5			BE	

Material Required for Examination	None

Question Source:	New	Question Modification Method:	

Question Source Comments:	

Comment Type	Comment

Record Number:	34	RO Number:	23	SRO Number:	

Question Topic PRT

Given the following conditions for Unit 1:

- Unit 1 is being heated up to return to power from a Cold Shutdown Condition.
  RCS is FILLED and VENTED.
- Pressurizer is SOLID.
- A Nitrogen blanet has been establish on the PRT.
- PRT Level is 95%.
- Waste Gas System is aligned to support a bubble.
- PZR Heaters are energized.

Prior to drawing a bubble in the pressurizer, which ONE of the following must be accomplished?

a. Bump the RCPs to remove entrained gasses.

b. Drain the PRT to 70-79%.

c. Drain the Pressurizer to 50%.

d. Pressurize the RCS to 200-275 psig.

Answer b **Exam Level** B **Cognitive Level** Memory **Facility:** Braidwood **ExamDate:** 10/29/01

Tier: Plant Systems **RO Group** 3 **SRO Group** 3

007 Pressurizer Relief Tank/Quench Tank System

K5. Knowledge of the operational implications of the following concepts as they apply to the Pressurizer Relief Tank/Quench Tank System:

K5.02 Method of forming a steam bubble in the PZR 3.1 3.4

Explanation of Answer B. Correct. Per the reference the PRT level is to be established at 70-79%. A. Incorrect. Bumping the RCPs is not necessary because the RCs is vacuum filled, and the conditions state the RCS is filled and vented already. C. Incorrect. Draining the pressurizer to NOL is accomplished AFTER the bubble is drawn. D. Incorrect. The bubble is drawn between 350 and 375 psig.

Reference Title	Facility Reference Number	Section	Page Number(s)	Revision	L. O.
Drawing a Pzr Bubble	BwOP RY-5			Rev. 10	
Plant Heatup	1BwGP 100-1	Step F. 26.	21	15	
Plant Heatup	1BGP 100-1	F.24	33	34	

Material Required for Examination None

Question Source: Other Facility **Question Modification Method:** Concept Used

Question Source Comments: Premise changed. Distractors changed. Answer changed.

Comment Type	Comment

Record Number: 35 **RO Number:** 24 **SRO Number:** 24

Question Topic	CCW

The following conditions are noted on Unit 1:

- A spurious start of a second CCW pump has occurred.
- Component Cooling Water Surge Tank level is DECREASING rapidly.

Assuming the surge tank level DECREASE continues,
which ONE of the following describes the response of makeup to the surge tank?

a. DEMIN Water makeup valve OPENS before the PRIMARY Water makeup valve, BOTH valves CLOSE at the same level.

b. PRIMARY Water makeup valve OPENS before the DEMIN Water makeup valve, BOTH valves CLOSE at the same level.

c. DEMIN Water makeup valve OPENS before the PRIMARY Water makeup valve, DEMIN Water makeup valve then CLOSES at a LOWER level than PRIMARY Water makeup valve.

d. PRIMARY Water makeup valve OPENS before the DEMIN Water makeup valve, PRIMARY Water makeup valve then CLOSES at a LOWER level than the DEMIN Water makeup valve.

Answer	a	Exam Level	R	Cognitive Level	Memory	Facility:	Braidwood	ExamDate:	10/29/01

Tier:	Plant Systems	RO Group	3	SRO Group	3

008	Component Cooling Water System		
K4.	Knowledge of Component Cooling Water System design feature(s) and or interlock(s) which provide for the following:		
K4.02	Operation of the surge tank, including the associated valves and controls	2.9	2.7

Explanation of Answer	Per reference, on a decreasing surge tank level, demin makeup occurs at 50%, then if level continues down, primary water makeup occurs at 45% or less. When level recovers to 55%, both make up sources close. A. Correct. B. Incorrect, wrong order of opening. C. Incorrect, wrong order of closing. D. Incorrect, wrong order of opening and closing.

Reference Title	Facility Reference Number	Section	Page Number(s)	Revision	L. O.
CC Surge Tank Auto Makeup On	BwAR 1-2-E4	B.1, B.2	1	1E3	
CC Surge Tank Auto Makeup On	BAR 1-2-E4	B.1, B.2, B.3	1	5	

Material Required for Examination	None

Question Source:	New	Question Modification Method:	

Question Source Comments:	

Comment Type	Comment

Record Number:	36	RO Number:	25	SRO Number:	

Question Topic	PZR PRESSURE CONTROL SYSTEM

The Master Pressurizer Pressure Controller OUTPUT has failed to MINIMUM.
Assuming NO operator action, which ONE of the following describes the effect on the Reactor Protection System?

a. OT Delta T Reactor Trip Setpoints INCREASE.

b. OP Delta T Reactor Trip Setpoints INCREASE.

c. OT Delta T Reactor Trip Setpoints DECREASE.

d. OP Delta T Reactor Trip Setpoints DECREASE.

Answer	Exam Level	Cognitive Level	Facility:	ExamDate:
a	B	Application	Braidwood	10/29/01

Tier:	RO Group	SRO Group
Plant Systems	2	2

010	Pressurizer Pressure Control System		
K3.	Knowledge of the effect that a loss or malfunction of the Pressurizer Pressure Control System will have on the following:		
K3.02	RPS	4.0	4.1

Explanation of Answer

A. Correct. C. Incorrect. Failing the output of the Controller Low, will close the sprays and turn on the heaters increasing pressure. An actual pressure increase puts the RCS further from DNB. OTDT trip setpoints are calculated using actual pressure and subtracting a fixed nominal pressure value. This difference is increasing, so the setpoint is increasing. B. and D Incorrect. Pressure does NOT figure into OPDT setpoint calculations.

Reference Title	Facility Reference Number	Section	Page Number(s)	Revision	L. O.
RTS Instrumentation Tech Spec Bases	Bases Table 3.3.1-1		3.3.1-17	110,116	
ZR ch 14	I1-RY-XL-01				21

Material Required for Examination	None

Question Source:	Other Facility	Question Modification Method:	Direct From Source

Question Source Comments:	Prairie Island 1997 NRC exam

Comment Type	Comment

Record Number:	37	RO Number:	26	SRO Number:	25

Question Topic	PZR LEVEL CONTROL SYSTEM

While performing a Heatup for restart, the following conditions are noted:

- Charging flow control is in MANUAL and controlling PZR level at 35%.
- CC flow to the letdown heat exchanger is in MANUAL due to an auto failure.
- RCS pressure has decreased, adding another letdown orifice has INCREASED letdown flow to 140 gpm.

Which ONE of the following predicts the plant response and decribes what procedural actions must be taken immediately?

a. To prevent a further decrease in PZR level, the NSO should DECREASE charging flow by throttling OPEN 1CV-121.

b. To prevent challenging the Demin High Temperature Divert valve, the NSO should DECREASE CC flow to the letdown heat exchanger by throttling OPEN 1CC-130A.

c. To prevent demineralizer resin channelling, the NSO should REDUCE letdown flow to less than 120 gpm by taking an orifice off line.

d. To prevent causing an AUTO Makeup to the VCT, the NSO should REDUCE letdown flow to less than 120 gpm by taking an orifice off line.

Answer	c	Exam Level	B	Cognitive Level	Comprehension	Facility:	Braidwood	ExamDate:	10/29/01

Tier:	Plant Systems	RO Group	2	SRO Group	2

011	Pressurizer Level Control System		
A2.	Ability to (a) predict the impacts of the following on the Pressurizer Level Control System and (b) based on those predictions, use procedures to correct, control, or mitigate the consequences of those abnormal operation:		
A2.01	Excessive letdown	3.2	3.1

Explanation of Answer: Exceeding 120 gpm letdown is undesirable due to channelling concerns. A. Incorrect, opening 121 will increase charging flow, increasing pzr level. B. Incorrect, decreasing CC flow would increase temperature causing a challenge. C. Correct. D. Incorrect, reducing letdown would increase VCT level, not decrease it to the auto makeup setpoint.

Reference Title	Facility Reference Number	Section	Page Number(s)	Revision	L. O.
CV System Limitation and Action	1BwGP 100-1, Plant Heatup	E.6.b	11	15	
Plant Heatup	1BGP 100-1 Plant Heatup	E.6.e	22	34	

Material Required for Examination	None

Question Source:	New	Question Modification Method:	

Question Source Comments:	

Comment Type	Comment

Record Number:	38	RO Number:	27	SRO Number:	26

Question Topic PZR PRESSURE CONTROL SYSTEM

While at 100% Reactor power, an instrument tap leak in the side of the Pressurizer developes. Charging and letdown have been manipulated to provide the following conditions:

- Pressurizer Pressure STABILIZED at 2215 psig.
- Pressurizer Level STABILIZED at 12%.

What is the status of the pressurizer heaters?

	VARIABLE HEATERS	BACKUP HEATERS
a.	ON	ON
b.	OFF	OFF
c.	ON	OFF
d.	OFF	ON

Answer b **Exam Level** B **Cognitive Level** Memory **Facility:** Braidwood **ExamDate:** 10/29/01

Tier: Plant Systems **RO Group** 2 **SRO Group** 2

011 Pressurizer Level Control System

K4. Knowledge of Pressurizer Level Control System design feature(s) and or interlock(s) which provide for the following:

K4.01 Operation of PZR heater cutout at low PZR level 3.3 3.7

Explanation of Answer A low pressure signal will turn on the heaters as follows: Variables operate at plus or minus 25 psig from Pref; and the B/U heaters come on at 2210 and turn off at 2218. However, Pressurizer level at 17% or less blocks all heaters from operating to prevent them from operating when uncovered. So even though there is a demand from pressure to operate the heaters, they don't because of level. B. Only correct answer.

Reference Title	Facility Reference Number	Section	Page Number(s)	Revision	L. O.
Horse Notes- Ch 14 Pressurizer	RY-2 PZR Pressure Control	Setpoints		4	
Alarm Response Procedure	BwAR 1-12-A4	B.1	1	5E4	
Alarm Response Procedure	BAR 1-12-A4	B.1	1	1	

Material Required for Examination none

Question Source: New **Question Modification Method:**

Question Source Comments:

Comment Type	Comment

Record Number: 39 **RO Number:** 28 **SRO Number:** 27

Question Topic PZR LEVEL CONTROL SYSTEM

While at 100% Reactor power on Unit 1, the following occurred:

- A trip of the operating charging pump resulted in the crew isolating letdown. Problem has been fixed, and letdown is about to be restored.

The crew should ____(1)____ first, then ___(2)____.

	___(1)___	___(2)____
a.	start the CV pump	establish letdown, to avoid flashing in the letdown line.
b.	establish letdown	start the CV pump, to avoid overcooling the mixed bed demineralizer.
c.	start the CV pump	establish letdown, to avoid overheating the mixed bed demineralizer.
d.	establish letdown	start the CV pump, to avoid an unwanted auto makeup to the VCT.

Answer a **Exam Level** B **Cognitive Level** Comprehension **Facility:** Braidwood **ExamDate:** 10/29/01

Tier: Plant Systems **RO Group** 2 **SRO Group** 2

011 Pressurizer Level Control System

K6. Knowledge of the effect of a loss or malfunction on the following will have on the Pressurizer Level Control System:

K6.01 Reasons for starting charging pump while increasing letdown flow rate 2.8* 3.2

Explanation of Answer A. Correct, cooling flow from charging is to prevent flashing in the letdown line. B., C. Incorrect, although establishing letdown first will provide hotter water to the demins, the hi temp divert valve will protect the demins. D. Incorrect, although prolonged letdown without charging will lower VCT level faster.

Reference Title	Facility Reference Number	Section	Page Number(s)	Revision	L. O.
Re-establishing CV Letdown During Abnormal Conditions.	1BwOA ESP-2	Step 4	3	0	

Material Required for Examination none

Question Source: New **Question Modification Method:**

Question Source Comments:

Comment Type	Comment

Record Number: 40 **RO Number:** 29 **SRO Number:** 28

Question Topic	REACTOR PROTECTION SYSTEM

During MODE 1 operations on Unit 1, the following maintenance needs to be accomplished:
The transmitter for Presurizer Pressure Channel, 1PT-457 needs to be calibrated and the entire channel must be placed in "TEST". A work package has been prepared and reviewed.

Tripping the bistables for this channel will result in various trip status lights being lit.

How many bistable switches are tripped when this channel is taken to test, and how many status lights are lit because of tripping these bistables?

a. 5 bistable switches are tripped, and 4 status lights are lit.

b. 5 bistable switches are tripped, and 5 status lights are lit.

c. 6 bistable switches are tripped, and 5 status lights are lit.

d. 6 bistable switches are tripped, and 6 status lights are lit.

Answer	c	Exam Level	R	Cognitive Level	Application	Facility:	Braidwood	ExamDate:	10/29/01

Tier:	Plant Systems	RO Group	2	SRO Group	2

012	Reactor Protection System		
A4.	Ability to manually operate and/or monitor in the control room:		
A4.04	Bistable, trips, reset and test switches	3.3*	3.3

Explanation of Answer: 1PT-457 has 6 bistables associated with it. OTDT trip, OTDT Runback, Low Pressure SI, PZR Hi Pressure, PZR Low Pressure, and P11. The P11 bistable is tripped when above its setpoint and the status light is NOT LIT when the bistable is tripped. One channel, 1PT-458, only has 5 bistables associated with it. C. Only correct answer.

Reference Title	Facility Reference Number	Section	Page Number(s)	Revision	L. O.
Operation with a Failed Pressure Channel	1BwOA INST-2 Att. B, 1BOA Inst -2	Step 5, step 5	13,13	57B,10 1	
Pressurizer ch 14 lesson plan	I1-RY-XL-01				20

Material Required for Examination	None

Question Source:	New	Question Modification Method:	

Question Source Comments:	

Comment Type	Comment

Record Number:	41	RO Number:	30	SRO Number:	

Question Topic	REACTOR PROTECTION SYSTEM

The Reactor is at 100% power.

Which ONE of the following will result in a Solid State Protection System Train A General Warning Alarm?

a. A Loss of 120 VAC Instrument Bus 112.

b. A Loss of 120 VAC Instrument Bus 114.

c. Rack IN and CLOSE Reactor Trip Bypass Breaker A (BYA).

d. Rack IN and CLOSE Reactor Trip Bypass Breaker B (BYB).

Answer	c	Exam Level	R	Cognitive Level	Memory	Facility:	Braidwood	ExamDate:	10/29/01

Tier:	Plant Systems	RO Group	2	SRO Group	2

012	Reactor Protection System		
K2.	Knowledge of bus power supplies to the following:		
K2.01	RPS channels, components, and interconnections	3.3	3.7

Explanation of Answer: A. B. and D. Incorrect, they would generate a Train B general warning alarm. C. Correct.

Reference Title	Facility Reference Number	Section	Page Number(s)	Revision	L. O.
Loss of Instrument Bus	1BwOA ELEC-2	Tables B and D	14, 19	7A	
Horse Notes - SSPS	SSPS-2, SSPS NOTES	General Warning		3	
Alarm Response Proc	BAR 1-4-B3	D.2.c	1	1	

Material Required for Examination	None

Question Source:	Facility Exam Bank	Question Modification Method:	Significantly Modified

Question Source Comments:	Changed Premise and Distractors, and answer.

Comment Type	Comment

Record Number:	42	RO Number:	31	SRO Number:	

Question Topic	ESFAS

In order to align valves in the NORMAL CHARGING flowpath to RESTORE CHARGING flow after a Reactor Trip and Safety Injection, the operators must . . .

a. RESET SI, then RESET Phase A.

b. RESET SI.

c. RESET SI, RESET Phase A, and then OPEN Instrument Air Containment Isolation Valves (1IA065 and 1IA066).

d. RESET Phase A, then OPEN Instrument Air Containment Isolation Valves (1IA065 and 1IA066).

Answer	c	Exam Level	B	Cognitive Level	Application	Facility:	Braidwood	ExamDate:	10/29/01

Tier:	Plant Systems	RO Group	1	SRO Group	1

013	Engineered Safety Features Actuation System		
K4.	Knowledge of Engineered Safety Features Actuation System design feature(s) and or interlock(s) which provide for the following:		
K4.02	Containment integrity system reset	3.9?	4.2

Explanation of Answer: A. Incorrect, Must also restore air to cnmt to allow CV to Regen Hx valve to open. B. Incorrect, need to reset Phase A, and re-establish air to cnmt. C. Correct, Reset SI is necessary to remove close signal from 8105 and 8106. D. Incorrect, need to reset SI to open 8105 and 8106.

Reference Title	Facility Reference Number	Section	Page Number(s)	Revision	L. O.
Horse Notes CVCS	CV-1, CVCS			4	
SI Termination	1BwEP ES-1.1	Steps 1-6	2-6	1A, WOG 1C	

Material Required for Examination	None

Question Source:	New	Question Modification Method:	

Question Source Comments:	

Comment Type	Comment

Record Number:	43	RO Number:	32	SRO Number:	29

Question Topic	ESFAS

The plant is operating at 100% Reactor power.
Containment Pressure Channel 1PT-937 fails HIGH.
NO operator actions have yet been taken.

Of the remaining channels, ___(1)___ is the MINIMUM number of channels that have to trip to cause a Containment Spray Actuation, and
___(2)_____ is the MINIMUM number of channels that have to trip to cause a Main Steam Isolation.

	___(1)___	___(2)___
a.	TWO	ONE
b.	ONE	TWO
c.	ONE	ONE
d.	TWO	TWO

Answer	b	Exam Level	B	Cognitive Level	Comprehension	Facility:	Braidwood	ExamDate:	10/29/01

Tier:	Plant Systems	RO Group	1	SRO Group	1

013	Engineered Safety Features Actuation System		
K6.	Knowledge of the effect of a loss or malfunction on the following will have on the Engineered Safety Features Actuation System:		
K6.01	Sensors and detectors	2.7*	3.1*

Explanation of Answer

CS actuation is a 2/4 coincidence. 1 channel is already tripped, because the premise states no operator action has been taken. (The Procedural action is to Bypass the failed channel). Therefore, only 1 more is necessary. MS isolation is 2/3 coincidence. The failed channel in the premise, does not input into the MS isolation logic. Therefore to get a MS isolation 2 channels must trip. The only correct combination is choice B.

Reference Title	Facility Reference Number	Section	Page Number(s)	Revision	L. O.
Horse Notes - ESF Setpoints	EF-2	Isoaltion signals		6	
Instrument Failure	1BwOA INST-2	Att. J	40,41		

Material Required for Examination	None

Question Source:	New	Question Modification Method:	

Question Source Comments:	

Comment Type	Comment

Record Number:	44	RO Number:	33	SRO Number:	30

Question Topic	ROD POSITION INDICATION SYSTEM

Rod Control System testing is in progress on Unit 2, and shutdown banks are being individually withdrawn.

/hich ONE of the following ROD BANK SELECT Switch positions will provide indications of BOTH of the following when the bank of moving rods is at 210 steps on the Bank Demand Step Counters:

- DRPI ROD Height within 12 steps,
  AND
- ROD SPEED.

a. SD B.

b. SD C.

c. SD D.

d. SD E.

Answer	a	Exam Level	B	Cognitive Level	Memory	Facility:	Braidwood	ExamDate:	10/29/01

Tier:	Plant Systems	RO Group	2	SRO Group	1

014	Rod Position Indication System		
A4.	Ability to manually operate and/or monitor in the control room:		
A4.02	Control rod mode-select switch	3.4	3.2

Explanation of Answer	SD banks C, D, E do NOT input into the rod speed indicator. All SD Banks have DRPI indication at 210 steps withdrawn. A. Correct.

Reference Title	Facility Reference Number	Section	Page Number(s)	Revision	L. O.
ıorse Notes- Reactor Control Unit	RD-2 Reactor Control Unit	Rod Speed		3	
Horse Notes- Digital Rod Position Ind	RD-6 Digital Rod Position Ind	Bezel		2	

Material Required for Examination	None

Question Source:	New	Question Modification Method:	

Question Source Comments:	

Comment Type	Comment

Record Number:	45	RO Number:	34	SRO Number:	31

Question Topic	NUCLEAR INSTRUMENTATION SYSTEM

With the Unit at 100% Reactor power, a REDUCTION in feedwater temperature occurred.

The relationship between NIS indicated power and actual reactor power is that NIS Power indicates .

a. HIGHER THAN actual power due to HIGHER Tave.

b. LOWER THAN actual power due to HIGHER Tave.

c. HIGHER THAN actual power due to LOWER T cold.

d. LOWER THAN actual power due to LOWER T cold.

Answer	d	Exam Level	B	Cognitive Level	Comprehension	Facility:	Braidwood	ExamDate:	10/29/01

Tier:	Plant Systems	RO Group	1	SRO Group	1

015	Nuclear Instrumentation System		
A1.	Ability to predict and/or monitor changes in parameters associated with operating the Nuclear Instrumentation System controls including:		
A1.03	NIS power indication	3.7	3.7

Explanation of Answer: D. Correct. T cold in the vessel downcomer has a greater effect on neutron leakage than Tave, so with colder T cold, less neutron leakage exists.

Reference Title	Facility Reference Number	Section	Page Number(s)	Revision	L. O.
Generic Reactor Control Guidance	1BwGP 100-8	F.8.c	23	10	

terial Required for Examination	None

uestion Source:	Other Facility	Question Modification Method:	Editorially Modified

Question Source Comments:	Millstone 3 2000 NRC exam

Comment Type	Comment

Record Number:	46	RO Number:	35	SRO Number:	32

Question Topic NUCLEAR INSTRUMENTATION SYSTEM

The following conditions exist on Unit 1:

- A Reactor Startup is in progress.
- Reactor Power is ABOVE the P6 Setpoint and STABLE.
- The Source Range High Flux Trips have NOT been blocked.

The Reactor will STAY CRITICAL if the Source Range N31 Level Trip Switch is in . . .

a. NORMAL, and N31 Instrument Power Fuses FAIL.

b. NORMAL, and N31 Control Power Fuses FAIL.

c. BYPASS, and N31 Instrument Power Fuses FAIL.

d. BYPASS, and N31 Control Power Fuses FAIL.

Answer c **Exam Level** B **Cognitive Level** Comprehension **Facility:** Braidwood **ExamDate:** 10/29/01

Tier: Plant Systems **RO Group** 1 **SRO Group** 1

015 Nuclear Instrumentation System

K1. Knowledge of the physical connections and/or cause-effect relationships between Nuclear Instrumentation System and the following:

K1.02 Vital ac systems 3.4 3.6

Explanation of Answer A. and B. Incorrect. A loss of either instrument power or control power when above P6 and Not blocked results in a trip due to the high flux bistable tripping. RPS requires a contact to close to generate the trip on high flux. The contact is able to close when a relay is energized. D. Incorrect. The relay requires control power. C. Correct. Going to level trip bypass removes control power, preventing the relay from being energized. Therefore the RPS contact can not close and cause a trip.

Reference Title	Facility Reference Number	Section	Page Number(s)	Revision	L. O.
Horse Notes- Intermediate Range	NI-3 Intermediate Range	SSPS		6	
Horse Notes- Source Range	NI-4 Souce range Detector	Chart		6	

Material Required for Examination none

Question Source: New **Question Modification Method:**

Question Source Comments:

Comment Type	Comment

Record Number: 47 **RO Number:** 36 **SRO Number:** 33

Question Topic IN CORE TEMPERATURE MONITOR SYSTEM

The following has occurred on Unit 1:

- Train 'A' CETCs has lost power.

What action, if any, is required to have current, correct Train 'A' CETC temperatures displayed after power is restored?

a. No action is required.

b. Must depress ACK pushbutton, then SYSTEM RESET pushbutton.

c. Must depress SYSTEM RESET pushbutton, then ACK pushbutton.

d. Must depress SYSTEM RESET pushbutton only.

Answer d **Exam Level** R **Cognitive Level** Memory **Facility:** Braidwood **ExamDate:** 10/29/01

Tier: Plant Systems **RO Group** 1 **SRO Group** 1

017 In-Core Temperature Monitor System

A4. Ability to manually operate and/or monitor in the control room:

A4.01 Actual in-core temperatures 3.8 4.1

Explanation of Answer D is only correct answer per reference.

Reference Title	Facility Reference Number	Section	Page Number(s)	Revision	L. O.
Placing CETC in Service	BwOP RC-12	F.4	2	8E2	
Placing CETC in service	BOP RC-12	F.4	2	1	

Material Required for Examination None

Question Source: New **Question Modification Method:**

Question Source Comments:

Comment Type	Comment

Record Number: 48 **RO Number:** 37 **SRO Number:**

Question Topic	IN CORE TEMPERATURE MONITORING SYSTEM

Unit 1 has experienced a LOCA. The crew has performed the appropriate procedures and are trying to reduce ECCS flow.
All equipment has operated properly. The following conditions and indications exist:

- Containment Pressure is 6.0 psig and STEADY.
- Containment Radiation is 105 mr/hr.
- Wide Range RCS pressure is 800 psig

70 degrees F of subcooling is needed to stop one of the ECCS pumps.

What is the maximum CETC temperature at which the pump is STOPPED?

a. 410 degrees F.

b. 420 degrees F.

c. 450 degrees F.

d. 520 degrees F.

Answer	c	Exam Level	S	Cognitive Level	Application	Facility:	Braidwood	ExamDate:	10/29/01
Tier?	Plant Systems	RO Group	1	SRO Group	1				

017	In-Core Temperature Monitor System		
2.1	Conduct Of Operations		
2.1.25	Ability to obtain and interpret station reference materials such as graphs, monographs, and tables which contain performance data.	2.8	3.1

Explanation of Answer: Taken from figure 1BwEP ES 1.2-1, Tsat for 800 psig is 520 degrees F. 520-70 = 450 degrees. Distractors A and B are viable if the wrong (normal or adverse) containment curves are referenced. Distractor D is Tsat for 800 psig.

Reference Title	Facility Reference Number	Section	Page Number(s)	Revision	L. O.
RCS Subcooling margin	Figure 1BwEP ES 1.2-1		35	1a, WOG 1C	
BEP ES 1.2	Fig 1BEP ES 1.2-1		36	100 WOG 1C	

Material Required for Examination: Figure 1BwEP ES 1.2-1 RCS Subcooling Margin (page 35)

Question Source: New **Question Modification Method:**

Question Source Comments:

Comment Type	Comment

Record Number: 49 **RO Number:** **SRO Number:** 34

Question Topic	IN CORE TEMPERATURE MONITOR SYSTEM

A Natural Circulation cooldown is being performed on Unit 1.

Which ONE of the following problems with a SINGLE Core Exit Thermocouple (CETC) will cause an .dication of Natural Circulation conditions degrading?

a. A SHORT developes at the head connection.

b. An OPEN developes at the head connection.

c. Corrosion developes at the head connection.

d. Loss of power occurs.

Answer	c	Exam Level	B	Cognitive Level	Comprehension	Facility:	Braidwood	ExamDate:	10/29/01
Tier:	Plant Systems	RO Group	1	SRO Group	1				

017	In-Core Temperature Monitor System		
K3.	Knowledge of the effect that a loss or malfunction of the In-Core Temperature Monitor System will have on the following:		
K3.01	Natural circulation indications	3.5*	3.7

Explanation of Answer: For natural circulation to degrade, CETCs will increase. An Open results in the input being eliminated from the averaging circuit. A Short results in being removed from the averaging circuit for being to low. Thermocouples need no power to operate, so a loss of power is immaterial. C. Correct, developing corrosion increases resistance. Increased resistance translates to increased (indicated) temperature. An increase in one of the inputs into the averaging circuit will cause the average indication to increase.

Reference Title	Facility Reference Number	Section	Page Number(s)	Revision	L. O.
Horse Notes- Inadequate Core Cooling	CORE-2	Core Exit Thermocouples		1	
Reactor Trip response	1BwEP ES-0.1	Attachment B	26	1a WOG 1C	

Material Required for Examination	None

Question Source:	New	Question Modification Method:	

Question Source Comments:	

Comment Type	Comment

Record Number:	50	RO Number:	38	SRO Number:	35

Question Topic: CONTAINMENT COOLING SYSTEM

The following conditions were present on Unit 1:

- 100% Reactor power.
- 1A and 1D RCFC were operating in HIGH SPEED.
- 1B RCFC was OFF.
- 1C RCFC was operating in LOW SPEED.

A Small Break LOCA occurred and the operators initiated SI.

For the first 20 seconds after the SI the ONLY RCFC(s) cooling containment was/were . . .

a. 1A and 1D.

b. 1B.

c. 1C.

d. 1B and 1C.

Answer	c	Exam Level	B	Cognitive Level	Comprehension	Facility:	Braidwood	ExamDate:	10/29/01

Tier:	Plant Systems	RO Group	1	SRO Group	1

022	Containment Cooling System		
A3.	Ability to monitor automatic operations of the Containment Cooling System including:		
A3.01	Initiation of safeguards mode of operation	4.1	4.3

Explanation of Answer: A. Incorrect, at T=0, the high speed breakers trip. B. Incorrect, a 20 second time delay exists even for fans that are off. C. Correct, Slow fan speeds are not affected by SI. D. Incorrect, 1B fan does not start for 20 seconds.

Reference Title	Facility Reference Number	Section	Page Number(s)	Revision	L. O.
Horse Notes Containment Cooling	VP-3, Containment Cooling	SI Actuation Signal		5	
Cnmt Vent ch 42	ch 42	C	27	3	

Material Required for Examination: None

Question Source: New **Question Modification Method:**

Question Source Comments:

Comment Type	Comment

Record Number: 51 **RO Number:** 39 **SRO Number:** 36

Question Topic CONTAINMENT COOLING SYSTEM

Which ONE of the following combinations of CRDM Booster and Exhaust Fans provides the MOST even air distribution across the CRDMs?

	CRDM Booster Fans	CRDM Exhaust Fans
a.	A and B	A and C
b.	A and C	A and D
c.	A and B	A and D
d.	A and C	A and C

Answer d **Exam Level** B **Cognitive Level** Memory **Facility:** Braidwood **ExamDate:** 10/29/01

Tier: Plant Systems **RO Group** 1 **SRO Group** 1

022	Containment Cooling System
K4.	Knowledge of Containment Cooling System design feature(s) and or interlock(s) which provide for the following:
K4.04	Cooling of control rod drive motors 2.8 3.1

Explanation of Answer D Correct for Braidwood per the reference. B Correct for Byron per the reference. Distractors A and C are incorrect at both sites.

Reference Title	Facility Reference Number	Section	Page Number(s)	Revision	L. O.
CRDM Vent system startup	BwOP VP-9	E.3	2	6	
Horse Notes Containment Vent	VP-1, Containment Vent	CRDM Booster Fan Trip		4	
CRDM Vent system startup	BOP VP-9	E.3, note prior to step 3.b	2,3	1	

Material Required for Examination None

Question Source: New **Question Modification Method:**

Question Source Comments:

Comment Type	Comment

Record Number: 52 **RO Number:** 40 **SRO Number:** 37

Question Topic	HYDROGEN RECOMBINER AND PURGE CONTROL SYSTEM

A LOCA has occurred on Unit 1 and it is necessary to start up the Hydrogen Recombiner system.

- Containment Hydrogen concentration is 3% and slowly increasing.
- Containment ambient temperature is 156 degrees F.

Which ONE of the following conditions must be met to place the Hydrogen Recombiner in service aligned to Unit 1?

a. At least ONE RCFC must be in operation and Containment Pressure must be LESS THAN 5 psig.

b. At least TWO RCFCs must be in operation and Containment Pressure must be LESS THAN 5 psig.

c. At Least ONE RCFC must be in operation and Containment Pressure must be LESS THAN 21 psig.

d. At Least TWO RCFCs must be in operation and Containment Pressure must be LESS THAN 21 psig.

Answer	d	Exam Level	B	Cognitive Level	Memory	Facility:	Braidwood	ExamDate:	10/29/01

Tier:	Plant Systems	RO Group	3	SRO Group	2

028	Hydrogen Recombiner and Purge Control System		
K1.	Knowledge of the physical connections and/or cause-effect relationships between Hydrogen Recombiner and Purge Control System and the following:		
K1.01	Containment annulus ventilation system (including pressure limits)	2.5*	2.5

Explanation of Answer	Per reference, the only correct answer is D.

Reference Title	Facility Reference Number	Section	Page Number(s)	Revision	L. O.
Startup of a Hydrogen Recombiner	BwOP OG-10	C. 2. & E.3.	2, 3	10	
Startup of a Hydrogen Recombiner	BOP OG-10	C.2, E.2	2, 3	7	

Material Required for Examination	None

Question Source:	New	Question Modification Method:	

Question Source Comments:	

Comment Type	Comment

Record Number:	53	RO Number:	41	SRO Number:	38

Question Topic	HYDROGEN RECOMBINER AND PURGE CONTROL SYSTEM

Assuming ALL Emergency Deisel Generators are OPERABLE, which Emergency Diesel Generator will power the 0B Hydrogen Recombiner during a Loss of Offsite Power to the Station?

a. 1A.

b. 1B.

c. 2A.

d. 2B.

Answer	b	Exam Level	B	Cognitive Level	Memory	Facility:	Braidwood	ExamDate:	10/29/01

Tier:	Plant Systems	RO Group	3	SRO Group	2

028	Hydrogen Recombiner and Purge Control System		
K2.	Knowledge of bus power supplies to the following:		
K2.01	Hydrogen recombiners	2.5*	2.8*

Explanation of Answer: Normal power supply is division 12. When the EDGs come up and power the ESF buses, 1B EDG is aligned to division 12.

Reference Title	Facility Reference Number	Section	Page Number(s)	Revision	L. O.
E lineup for Off Gas system	BwOP OG-E4		2	4E3	
E Lineup for Off Gas system	BOP OG-E1		4	4	

Material Required for Examination	None

Question Source:	New	Question Modification Method:	

Question Source Comments:	

Comment Type	Comment

Record Number:	54	RO Number:	42	SRO Number:	39

Question Topic	CONTAINMENT PURGE SYSTEM

The following conditions exist on Unit 1:

- Unit 1 is in MODE 1.
- All RCFCs are in HIGH speed.
- Containment air sample results require a purge of containment to allow maintenance.
- Containment release package has appropriate approvals.
- Mini-Flow Purge Exhaust Isolation Valves (1VQ005A, B and C) are OPEN.
- Mini-Flow Purge Supply Isolation Valves (1VQ004A, and B) are OPEN.

The operator takes the control switch for the Mini-Flow Purge Supply Fan to "START" and then IMMEDIATELY releases the switch to the "NAC" position.

The Mini-Flow Purge Supply fan . . .

a. Does NOT Start. The operator must start the Mini-Flow Purge Exhaust fan first.

b. Does NOT Start. The operator must hold the start switch in the start position until the suction damper, 1VQ01Y, is OPEN.

c. Starts. The operator must immediately OPEN the suction damper, 1VQ01Y.

d. Starts. The operator must START the Mini-Flow Purge Exhaust fan before containment pressure reaches 0.3 psig.

Answer	Exam Level	Cognitive Level	Facility:	ExamDate:
b	B	Comprehension	Braidwood	10/29/01

Tier:	RO Group	SRO Group
Plant Systems	2	2

029	Containment Purge System
A2.	Ability to (a) predict the impacts of the following on the Containment Purge System and (b) based on those predictions, use procedures to correct, control, or mitigate the consequences of those abnormal operation:

A2.01	Maintenance or other activity taking place inside containment	2.9	3.6

Explanation of Answer: There is an interlock to prevent the supply fan from starting until the suction damper is open. C. and D. Incorrect because they state the fan starts. A. Incorrect, because there is no interlock to start the exhaust fan first. B Correct

Reference Title	Facility Reference Number	Section	Page Number(s)	Revision	L. O.
Containment Mini-purge system Operation.	BwOP VQ-6	F.6 Note	6	12	
Cnmrt mini Purge system Operation	BOP VQ-6	F.6 Note	4	5	

Material Required for Examination: none

Question Source: New | **Question Modification Method:**

Question Source Comments:

Comment Type	Comment

Record Number: 55 | **RO Number:** 43 | **SRO Number:** 40

Question Topic	CONTAINMENT PURGE SYSTEM

The detector for 1RT-AR011, Containment Fuel Handling Incident Train A rad monitor, fails causing the output to go HIGH.

/hich ONE of the following would AUTOMATICALLY occur due to this failure?

a. CLOSES 1VQ005C, Containment Mini-Flow Purge Exhaust Isolation.

b. STARTS 0VA04CB, Fuel Handling Building Charcoal Booster Fan.

c. STARTS 0VA04CA, Fuel Handling Building Charcoal Booster Fan.

d. CLOSES 1VQ003, Containment Post-LOCA Purge Exhaust Isolation.

Answer	a	Exam Level	R	Cognitive Level	Memory	Facility:	Braidwood	ExamDate:	10/29/01

Tier:	Plant Systems	RO Group	2	SRO Group	2

029	Containment Purge System		
K1.	Knowledge of the physical connections and/or cause-effect relationships between Containment Purge System and the following:		
K1.02	Containment radiation monitor	3.3	3.6

Explanation of Answer: A. Correct. B and C Incorrect, the charcoal fans are interlocked with the AR055/56, not the AR011. D. Incorrect, Post LOCA purge exhaust is interlocked with AR012.

Reference Title	Facility Reference Number	Section	Page Number(s)	Revision	L. O.
Annunciator Response Procedures	BwAR 4-1AR012J/11J	B.2	1	2	
BwOP AR/PR-11T1			4,5	8	
Horse Notes- Containment Purge	VP-2 Cnmt Purge	CNMT Vent Isol Valves		5	

Material Required for Examination	None

Question Source:	Facility Exam Bank	Question Modification Method:	Significantly Modified

Question Source Comments:	49-AR/PR-033

Comment Type	Comment

Record Number:	56	RO Number:	44	SRO Number:	

Question Topic	SPENT FUEL POOL COOLING SYSTEM

The following conditions exist at the plant:

- BOTH Units are in MODE 1 at Rated Thermal Power.
- The SFP level at the Tech Spec limit.
- The Transfer Canal is drained for maintenance work on one of the Upenders.
- The Sluice Gate OPENS allowing the SFP to drain into the Transfer Canal.

With NO operator action, Spent Fuel Pool Temperature will . . .

a. DECREASE due to MORE Spent Fuel Pool water flow though the Spent Fuel Pool Heat Exchanger.

b. DECREASE due to LESS Spent Fuel Pool water volume needing to be cooled.

c. INCREASE due to MORE Spent Fuel Pool water volume needing to be cooled.

d. INCREASE due to LESS Spent Fuel Pool water flow through the Spent Fuel Pool Heat Exchanger.

Answer	d	**Exam Level**	B	**Cognitive Level**	Comprehension	**Facility:**	Braidwood	**ExamDate:**	10/29/01

Tier:	Plant Systems	**RO Group**	2	**SRO Group**	2

033	Spent Fuel Pool Cooling System		
K3.	Knowledge of the effect that a loss or malfunction of the Spent Fuel Pool Cooling System will have on the following:		
K3.03	Spent fuel temperature	3.0	3.3

Explanation of Answer

D. Correct. The normal level of the SFP is a few inches above the tech spec limit. The suction pipe for the SFP pumps ends <7 feet below the normal water level in the SFP. Opening the Sluice Gate (when the SFP is at the Tech spec limit) on an empty canal will drop SFP level far enough (~7 ft) interrupting suction flow to the pump. With less SFP water flow through the hx, SFP temperature of the SFP will increase. There is no water in a drained canal to add to the heat sink available, total mass available for cooling does not change.

Reference Title	Facility Reference Number	Section	Page Number(s)	Revision	L. O.
Horse Notes- Fuel Pool Cooling	FC-1 Fuel Pool Cooling	Dewatering prevention		2	
SFP ch 51 system desc			29	4	

Material Required for Examination	none

Question Source:	New	**Question Modification Method:**	

Question Source Comments:	

Comment Type	Comment

Record Number:	57	**RO Number:**	45	**SRO Number:**	41

Question Topic	MAIN AND REHEAT STEAM SYSTEM

While withdrawing CONTROL BANKS during a Reactor Startup following a 5 day mid-cycle outage, which ONE of the following will result in the CRITICAL ROD HEIGHT being LOWER THAN the predicted value in the ECC?

a. REDUCED Feed Flow.

b. FAILED OPEN S/G PORV.

c. ISOLATION of all MSIVs.

d. BORATE the RCS 10 gallons.

Answer	b	Exam Level	B	Cognitive Level	Comprehension	Facility:	Braidwood	ExamDate:	10/29/01

Tier:	Plant Systems	RO Group	2	SRO Group	2

039	Main and Reheat Steam System		
K5.	Knowledge of the operational implications of the following concepts as they apply to the Main and Reheat Steam System:		
K5.08	Effect of steam removal on reactivity	3.6	3.6

Explanation of Answer

A. Incorrect reducing FW flow will heat up the RCS, and will result in a higher CRH (if it changes at all). B. Correct, a cooldown of the RCS will occur. Mid cycle after a 5 day outage means xenon free, and Neg MTC. Therefore cooldown adds positive reactivity, reducing the amount of positive reactivity necessary to go critical with the rods. C. Incorrect, MSIV isolation heats up the RCS, adding negative reactivity, raising CRH. D. Incorrect, boration adds negative reactivity, requiring more positive reactivity from the rods, raising CRH.

Reference Title	Facility Reference Number	Section	Page Number(s)	Revision	L.O.
Reactor theory ch 7 lesson plan	chapterr 7		20		

Material Required for Examination	None

Question Source:	New	Question Modification Method:	

Question Source Comments:	

Comment Type	Comment

Record Number:	58	RO Number:	46	SRO Number:	42

Question Topic MAIN TURBINE GENERATOR SYSTEM

A spurious turbine runback occurs on Unit 1, reducing power from 100% to 60% as designed.

If the effects of shrink and swell are IGNORED, which ONE of the following describes the INITIAL plant response?

a. Steam Dumps arm and open to return Tave to the program value.

b. Feed Reg Valves throttle open to increase steam generator levels.

c. Rods withdraw to restore Tave to the program value.

d. Feed Reg Valves throttle close to reduce steam generator levels.

Answer d **Exam Level** B **Cognitive Level** Application **Facility:** Braidwood **ExamDate:** 10/29/01

Tier: Plant Systems **RO Group** 3 **SRO Group** 3

045 Main Turbine Generator System

K3. Knowledge of the effect that a loss or malfunction of the Main Turbine Generator System will have on the following:

K3.01 Remainder of the plant 2.8 3.1

Explanation of Answer A. Incorrect, steam dumps will only get within 3 degrees of Tref due to Load reject dead band. B. Incorrect, feed reg valves will close to reduce feed flow. C. Incorrect, Rods will insert to lower Tave. D. Correct, less steam flow needs less feed flow.

Reference Title	Facility Reference Number	Section	Page Number(s)	Revision	L. O.
Horse Notes Steam Dumps ch 24	MS-4 Main Steam Dumps			6	
Horse Notes Rod Control ch 28	RD-2 Reactor Control Unit			3	

Material Required for Examination None

Question Source: New **Question Modification Method:**

Question Source Comments:

Comment Type	Comment

Record Number: 59 **RO Number:** 47 **SRO Number:** 43

Question Topic	CONDENSATE SYSTEM

Given the following Unit 1 conditions:

- 100% Reactor power.
- THREE CD/CB pumps are running.
- The CD/CB Pump Selector Position is selected to the STANDBY CD/CB Pump.
- 1B and 1C Feedwater pumps are running.

Which ONE of the following AUTOMATIC actions occurs if the shaft shears between the reduction gear and the condensate pump casing for a running CD pump and what MANUAL action needs to be performed?

	AUTOMATIC ACTIONS	MANUAL ACTIONS NECESSARY
a.	1CD152, CD Pump Recirc Valve OPENS.	TRIP affected CD/CB Pump and CLOSE 1CD152.
b.	1CD157A and B, GS Condenser Bypass Valves OPEN.	Manually OPEN 1CD210A and B, CP Bypass Valves.
c.	1HD046A and B, HDP Discharge Valves CLOSE.	Manually OPEN 1HD046A and B to prevent HDT overfill.
d.	Both Main Feed Pump speeds DECREASE.	Manually INCREASE feed pumps speed to restore Feed/Steam delta P.

Answer	b	Exam Level	B	Cognitive Level	Application	Facility:	Braidwood	ExamDate:	10/29/01

Tier:	Plant Systems	RO Group	1	SRO Group	1

056	Condensate System		
A2.	Ability to (a) predict the impacts of the following on the Condensate System and (b) based on those predictions, use procedures to correct, control, or mitigate the consequences of those abnormal operation:		
A2.04	Loss of condensate pumps	2.6	2.8*

Explanation of Answer

The shaft shear will reduce NPSH to the MFPs and cause the auto actions associated with NPSH Low. These are: 1CD152 Closes (Answer A incorrect); 1CD157A and B Open, to increase NPSH open 1CD210A and B (Answer B Correct); 1HD046A and B Open (answer C incorrect). Main feed pump speed is not directly controlled by NPSH low, however, a decrease in NPSH will result in a decrease in feed flow. The feed reg valves will open, reducing feed and steam delta P. The main feed pumps speed will increase, vice decrease (answer D incorrect).

Reference Title	Facility Reference Number	Section	Page Number(s)	Revision	L. O.
Secondary Pump Trip	1BwOA SEC-1, Attachment B	step 5.a	15	100	

Material Required for Examination	None

Question Source:	Previous 2 NRC Exams	Question Modification Method:	Significantly Modified

Question Source Comments:	Braidwood 1999 NRC exam

Comment Type	Comment

Question Topic MAIN FEEDWATER SYSTEM

Given the following Unit 1 conditions:

- 50% Reactor power.
- 1C Feedwater pump is operating in AUTOMATIC.
- ATWS Mitigation System (AMS) has inadvertently actuated.
- Both Auxiliary Feed Pumps are running.
- SG levels are INCREASING.

Which ONE of the following describes the response of the 1C Feedwater pump to this event?

Main Feed Pump Turbine speed will . . .

a. INCREASE due to an increase in SG steam flow.

b. REMAIN CONSTANT since level does NOT affect speed.

c. DECREASE due to an increase in feedwater header pressure.

d. DECREASE due to an increase in steam header pressure.

Answer c **Exam Level** B **Cognitive Level** Comprehension **Facility:** Braidwood **ExamDate:** 10/29/01

Tier: Plant Systems **RO Group** 1 **SRO Group** 1

059 Main Feedwater System

A1. Ability to predict and/or monitor changes in parameters associated with operating the Main Feedwater System controls including:

A1.07 Feed Pump speed, including normal control speed for ICS 2.5* 2.6*

Explanation of Answer C. Correct. As SG levels rise, the FRVs will throttle close to restore SG level to program level. As feed flow is reduced, feedwater header pressure will rise. Feed pump speed is controlled to maintain a program DP between feed and steam pressure. The program DP is calculated from total steam flow. As the FRV closes and feed pressure increases, the actual DP increases. Program DP does not change, so a signal will be generated to lower actual DP. This is accomplished by lowering pump speed. Steam header pressure should not change, but if it did the response would be as stated. Level does not input into speed control, but speed would change.

Reference Title	Facility Reference Number	Section	Page Number(s)	Revision	L. O.
Horse Notes	FW-3, Feedwater Notes	Program DP		1	
SGWLC System, Ch. 27	I1-FW-XL-01	I.B.2; I.C.2.a	5, 7	6	11.16

Material Required for Examination None

Question Source: Previous 2 NRC Exams **Question Modification Method:** Direct From Source

Question Source Comments: Braidwood 1999 NRC exam

Comment Type	Comment

Record Number: 61 **RO Number:** 49 **SRO Number:** 45

Question Topic MAIN FEEDWATER SYSTEM

Given the following conditions on Unit 1:

- 33% Reactor power.
- 1B Feedwater pump is operating.
- Steam Generator Water Level Controls are in AUTOMATIC.

Which ONE of the following failures will cause RCS Tave to INITIALLY INCREASE?

a. Selected Level Channel 1LT-519 fails LOW.

b. Selected Steam Pressure Channel 1PT-514 fails HIGH.

c. Feed Reg Bypass Valve, 1FW510A fails OPEN.

d. Feed Header Pressure Transmitter 1PT-508 fails HIGH.

Answer d **Exam Level** B **Cognitive Level** Application **Facility:** Braidwood **ExamDate:** 10/29/01

Tier: Plant Systems **RO Group** 1 **SRO Group** 1

059 Main Feedwater System

K3. Knowledge of the effect that a loss or malfunction of the Main Feedwater System will have on the following:

K3.04 RCS 3.6 3.8

Explanation of Answer

A. Incorrect, a low failure of the controlling level channel will increase feed flow causing a reduction in Tave. B. Incorrect, a high failure of controlling steam pressure will cause a stm flow feed flow mismatch, feed flow low, resulting in an increase in feed flow and a decrease in Tave. C. Incorrect, a failure open of the FRB/P valve increases feed flow and reduces Tave. D. Correct, a failure high of the feed header pressure controller will cause actual feed/stm DP to appear to be too high. With the 1A MFP operating, the flow control valve, 1FW016, will be throttled close. This will decrease feed flow an cause an increase in Tave.

Reference Title	Facility Reference Number	Section	Page Number(s)	Revision	L. O.
SGWLC Ch 27	I1-FW-XL-01	II.C.2		6	11,16
Feed Pump speed Control Ch 37B	Figure 37b-2				

Material Required for Examination None

Question Source: Previous 2 NRC Exams **Question Modification Method:** Significantly Modified

Question Source Comments: Braidwood 1999 NRC exam

Comment Type	Comment

Record Number: 62 **RO Number:** 50 **SRO Number:** 46

Question Topic AUXILLIARY FEEDWATER SYSTEM

Which ONE of the following provides "STARTING" power to the 1B Auxilliary Feedwater pump diesel engine?

a. 125 VDC Bus 112.

b. 125 VDC Bus 114.

c. 250 VDC Bus 123.

d. 24 VDC Battery Bank.

Answer d **Exam Level** B **Cognitive Level** Memory **Facility:** Braidwood **ExamDate:** 10/29/01

Tier: Plant Systems **RO Group** 1 **SRO Group** 1

061 Auxiliary / Emergency Feedwater System

K2. Knowledge of bus power supplies to the following:

K2.03 AFW diesel driven pump 4.0* 3.8*

Explanation of Answer There are 2 separate 24VDC battery banks available for starting power for the Aux Feed diesel. D is the only correct answer.

Reference Title	Facility Reference Number	Section	Page Number(s)	Revision	L. O.
Horse Notes	AF-1 Auxiliary Feedwater System	Diesel AF pp		3	
AFW ch 26 sys desc	ch 26	II Engine	16	7	

Material Required for Examination None

Question Source: New **Question Modification Method:**

Question Source Comments:

Comment Type	Comment

Record Number: 63 **RO Number:** 51 **SRO Number:** 47

Question Topic	AC ELECTRICAL DISTRIBUTION SYSTEM

How is power supplied to 120 VAC Instrument Bus 112 when the "RESERVE AC" feeder breaker supplying the bus is CLOSED?

a. 125 VDC from Battery 112, supplied to 125 VDC Bus 112 and INVERTED to 120 VAC.

b. 480 VAC from MCC 132X2 INVERTED to 120 VAC.

c. 480 VAC from MCC 132X1 TRANSFORMED to 120 VAC.

d. 480 VAC from MCC 132X1 RECTIFIED to 125 VDC and INVERTED to 120 VAC.

Answer	c	**Exam Level**	B	**Cognitive Level**	Memory	**Facility:**	Braidwood	**ExamDate:**	10/29/01

Tier:	Plant Systems	**RO Group**	2	**SRO Group**	2

062	A.C. Electrical Distribution		
K2.	Knowledge of bus power supplies to the following:		
K2.01	Major system loads	3.3	3.4

Explanation of Answer: Reserve power is transformed from 480 VAC to 120 VAC from MCC132X1. A. Incorrect, this describes a path for when the battery charger is off line, and the battery is supplying the inverter. B. Incorrect, there would be no reason to INVERT AC to AC power. C. Correct, the 480 VAC is transformed to 120 VAC. D. Incorrect, AC is not rectified to DC, then inverted back to AC.

Reference Title	Facility Reference Number	Section	Page Number(s)	Revision	L. O.
Horse Notes	I&C-2, AC Bus 112 and 113	112		2	
AC Distribution ch 4 system desc		fig 10a, 10b, 11			

Material Required for Examination	None

Question Source:	Previous 2 NRC Exams	**Question Modification Method:**	Direct From Source

Question Source Comments:	Braidwood 1999 NRC exam

Comment Type	Comment

Record Number:	64	**RO Number:**	52	**SRO Number:**	48

Question Topic	EMERGENCY DIESEL GENERATOR

While in MODE 1, an inadvertant SI occurred.
The operators performed the following:

- RESET the SI.
- Terminated ECCS flow.

Shortly after stopping the last ECCS pump, a LOSS of OFFSITE POWER occurred.

ONE MINUTE later, which ONE of the following pumps were running?

a. 1A CV pump.

b. 1A SI pump.

c. 1A RH pump.

d. 1A CS pump.

Answer	a	Exam Level	B	Cognitive Level	Memory	Facility:	Braidwood	ExamDate:	10/29/01

Tier:	Plant Systems	RO Group	2	SRO Group	2

064	Emergency Diesel Generators		
A3.	Ability to monitor automatic operations of the Emergency Diesel Generators including:		
A3.12	Purpose of automatic load sequencer	3.3*	3.5

Explanation of Answer: The only pump that will sequence on the diesel for a safe shutdown actuation is the CV pump. Distractors B and C need another SI signal to provide the Safeguards Actuation Relay signal. The CS pump would only sequence on high 3 cnmt pressure.

Reference Title	Facility Reference Number	Section	Page Number(s)	Revision	L. O.
Horse Notes- D/G Relaying	DG-2 D/G Relaying	Sequencing order.		3	
SI Termination	1BwEP ES-1.1	Caution	2	1A, WOG 1C	

Material Required for Examination	None

Question Source:	New	Question Modification Method:	

Question Source Comments:	

Comment Type	Comment

Record Number:	65	RO Number:	53	SRO Number:	49

Question Topic	EMERGENCY DIESEL GENERATOR

Which ONE of the following requires a 50.59 review?

a. Opening the Turbine Oil Cooler Temperature Control Bypass valve.

b. Exchanging a "like for like" fuse in the Rod Control cabinets.

c. Changing the DG Start time from 10 to 13 seconds.

d. Using a Service Air drop to operate a pneumatic tool.

Answer	c	Exam Level	S	Cognitive Level	Memory	Facility:	Braidwood	ExamDate:	10/29/01

Tier:	Plant Systems	RO Group	2	SRO Group	2

064	Emergency Diesel Generators		
2.2	Equipment Control		
2.2.5	Knowledge of the process for making changes in the facility as described in the safety analysis report.	1.6	2.7

Explanation of Answer: Procedurally directed actions do NOT require a 50.59 review, because the procedure has been reviewed and approved. Using a service air drop does not require a 50.59 review. Only Correct answer is C.

Reference Title	Facility Reference Number	Section	Page Number(s)	Revision	L.O.
50.59 screening procedures	LS-AA-104-1000		4-6		

Material Required for Examination	None

Question Source:	New	Question Modification Method:	

Question Source Comments:	

Comment Type	Comment

Record Number:	66	RO Number:		SRO Number:	50

Question Topic	LIQUID RADWASTE SYSTEM

Which ONE of the following tanks provides an INPUT to the WASTE GAS VENT HEADER?

a. Turbine Building Equipment Drain Tank.

b. Radwaste Monitor Tank.

c. Release Tank.

d. Pressurizer Relief Tank.

Answer	d	Exam Level	R	Cognitive Level	Memory	Facility:	Braidwood	ExamDate:	10/29/01

Tier:	Plant Systems	RO Group	1	SRO Group	1

068	Liquid Radwaste System		
K1.	Knowledge of the physical connections and/or cause-effect relationships between Liquid Radwaste System and the following:		
K1.02	Waste gas vent header	2.5	2.6

Explanation of Answer	Distractor A, B, C are liquid radwaste tanks. TBEDT goes to RW Evap. RMT goes to Release tank. Release Tank goes to environment. D. Correct. PRT goes to waste gas vent header.

Reference Title	Facility Reference Number	Section	Page Number(s)	Revision	L. O.
Horse Notes- Liquid Radwaste	RW-2 Liquid Radwaste	Notes and Drwg		0	
Horse Notes- Gaseous Radwaste	RW-1 Gaseous Radwaste	Inputs and Drwg		0	

Material Required for Examination	none

Question Source:	New	Question Modification Method:	

Question Source Comments:	

Comment Type	Comment

Record Number:	67	RO Number:	54	SRO Number:	

Question Topic LIQUID RADWASTE SYSTEM

What TWO conditions will INDEPENDENTLY cause automatic CLOSURE of Liquid Radwaste Release Tank Pump Discharge Key Locked valve, 0WX353?

a. LOW Circulating Water Blowdown flow, and HIGH Radiation sensed in the release header.

b. LOW Circulating Water Blowdown flow, and HIGH Radiation sensed in the Circulating Water Blowdown flow.

c. HIGH Release Header flow, and HIGH Radiation sensed in the release header.

d. HIGH Release Header flow, and HIGH Radiation sensed in the Circulating Water Blowdown flow.

Answer a **Exam Level** R **Cognitive Level** Memory **Facility:** Braidwood **ExamDate:** 10/29/01

Tier: Plant Systems **RO Group** 1 **SRO Group** 1

068 Liquid Radwaste System

K4. Knowledge of Liquid Radwaste System design feature(s) and or interlock(s) which provide for the following:

K4.01 Safety and environmental precautions for handling hot, acidic, and radioactive liquids 3.4 4.1

Explanation of Answer A. Correct. The discharge key locked valves WX353 and WX896 will close on 1) High Rad on release tank line, or 2) Low CW blowdown flow. B. C. D. Incorrect. The blowdown flow is NOT monitored. High release header flow is NOT an input to isolate valves.

Reference Title	Facility Reference Number	Section	Page Number(s)	Revision	L. O.
Horse Notes Liquid Radwaste	RW-2	RW Release Tank		0	
Liquid Radwaste System Ch 48a	I1-CM-XL-01 Ch 48a	II.A.2.j.6)	9,10	6	10
Release Tank Operations Overview	BOP WX-120	E.3,4	4	6	

Material Required for Examination None

Question Source: Previous 2 NRC Exams **Question Modification Method:** Direct From Source

Question Source Comments: Braidwood 1999 NRC exam

Comment Type	Comment

Record Number: 68 **RO Number:** 55 **SRO Number:**

Question Topic	WASTE GAS DISPOSAL SYSTEM

Unit 1 is at 100% Reactor power.

While venting the VCT to the Waste Gas Header, an explosive mixture developes in the IN SERVICE as Decay Tank.

Which ONE of the following actions is required?

a. Purge the VCT with Hydrogen.

b. Purge the VCT with Nitrogen.

c. Transfer a STANDBY tank's contents to the IN SERVICE Tank.

d. Release the contents of the IN SERVICE Gas Decay Tank.

Answer	Exam Level	Cognitive Level	Facility:	ExamDate:
d	S	Comprehension	Braidwood	10/29/01

Tier:	RO Group	SRO Group
Plant Systems	1	1

071	Waste Gas Disposal System		
2.1	Conduct Of Operations		
2.1.20	Ability to execute procedure steps.	4.3	4.2

Explanation of Answer: A. Incorrect, purging with hydrogen is performed when the VCT has the explosive mixture, but the premise is the GDT. B. Incorrect, Purging the VCT with N2 is done in a s/d condition. C. Incorrect, transferring a standby tank is not procedurally directed. D. Correct. Per the reference.

Reference Title	Facility Reference Number	Section	Page Number(s)	Revision	L. O.
Oxygen/Hydrogen Exoplosive mixture	0BwOA PRI-9	step 3	2	51A	
xygen/ Hydrogen Explosive mixture	0BOA PRI-9	step 3	2	1	

Material Required for Examination	none

Question Source:	New	Question Modification Method:	

Question Source Comments:	

Comment Type	Comment

Record Number:	69	RO Number:		SRO Number:	51

Question Topic WASTE GAS DISPOSAL SYSTEM

The AUTOMATIC realignment of the STANDBY Waste Gas Decay Tank will occur when the ON LINE Tank . . .

a. Reaches 5.0 Curies.

b. EXCEEDS 100 days in service.

c. Reaches 95 psig.

d. Requires 2 Compressors to maintain pressure.

Answer c **Exam Level** R **Cognitive Level** Memory **Facility:** Braidwood **ExamDate:** 10/29/01

Tier: Plant Systems **RO Group** 1 **SRO Group** 1

071	Waste Gas Disposal System		
2.1	Conduct Of Operations		
2.1.22	Ability to determine Mode of Operation.	2.8	3.3

Explanation of Answer A. Incorrect, there is no auto swap for high activity in the GDTs. B. Incorrect, there is no auto swap for time in service for the GDTs. C. Correct. D. Incorrect, there is no auto swap for a minimum pressure in the GDTs.

Reference Title	Facility Reference Number	Section	Page Number(s)	Revision	L. O.
Gas decay Tank operations	BwOP-GW-1	E.3	3	7E1	
Gas decay tank ops	BOP GW-1	E.2	3	7	
Horse Notes - Gaseous Radwaste	RW-1	Gas Decay Tanks		0	

Material Required for Examination none

Question Source: Other Facility **Question Modification Method:** Editorially Modified

Question Source Comments: 1995 Palisades NRC exam

Comment Type	Comment

Record Number: 70 **RO Number:** 56 **SRO Number:**

Question Topic	WASTE GAS DISPOSAL SYSTEM

Of the following mixtures containing various concentrations of Hydrogen and Oxygen, which ONE requires IMMEDIATE SUSPENSION of additions to the WASTE GAS HOLDUP SYSTEM?

	HYDROGEN CONCENTRATION	OXYGEN CONCENTRATION
a.	8%	3%
b.	3%	8%
c.	4%	3%
d.	5%	5%

Answer	d	Exam Level	B	Cognitive Level	Memory	Facility:	Braidwood	ExamDate:	10/29/01
Tier:	Plant Systems	RO Group	1	SRO Group	1				

071	Waste Gas Disposal System		
K5.	Knowledge of the operational implications of the following concepts as they apply to the Waste Gas Disposal System:		
K5.04	Relationship of hydrogen/oxygen concentrations to flammability	2.5	3.1

Explanation of Answer: When the concentration of oxygen in the waste gas holdup system is > 4% by volume and the hydrogen concentration is > 4% by volume, immediately suspend all additions of waste gas to the system. A. Incorrect O2 is too low. B. Incorrect, H2 is too low. C. Incorrect, Both H2 and O2 are too low. D. Correct. Both H2 and O2 exceed 4%.

Reference Title	Facility Reference Number	Section	Page Number(s)	Revision	L. O.
RM, Appendix L, Explosive Gas and Storage Tank Monitoring Program		1.6, and 1.7	5	1	

Material Required for Examination	None

Question Source:	Other Facility	Question Modification Method:	Concept Used
Question Source Comments:	INPO data bank #13412, exam date 1995		

Comment Type	Comment

Record Number:	71	RO Number:	57	SRO Number:	52

Question Topic AREA RADIATION MONITORING

Radiation levels in the Fuel Handling Building INCREASE causing BOTH Fuel Handling Building Incident rad monitors (AR055 and AR056) to simultaneously reach their actuation setpoints.

/hich ONE of the following would AUTOMATICALLY occur due to this condition?

a. B Train FHB Charcoal Booster Fan starts, then A Train FHB Charcoal Booster Fan starts.

b. B Train FHB Charcoal Booster Fan will start ONLY IF A Train has failed to start.

c. A Train FHB Charcoal Booster Fan starts, then B Train FHB Charcoal Booster Fan starts.

d. A Train FHB Charcoal Booster Fan will start ONLY IF B Train has failed to start.

Answer d **Exam Level** R **Cognitive Level** Memory **Facility:** Braidwood **ExamDate:** 10/29/01

Tier: Plant Systems **RO Group** 1 **SRO Group** 1

072 Area Radiation Monitoring System

A3. Ability to monitor automatic operations of the ARM system including:

A3.01 Changes in ventilation alignment 2.9* 3.1

Explanation of Answer A Incorrect, damper interlocks prevent both trains from starting. B Train gets a start signal first. When it starts and positions its dampers, an interlock prevents A from starting. B. Incorrect, it is the reverse of D, the correct answer. C. Incorrect, B gets the start signal first. D. Correct.

Reference Title	Facility Reference Number	Section	Page Number(s)	Revision	L. O.
Horse Notes Aux Bldg Vent	VA-2	FHB Interlocks			
System LP Ch 43A			11,34,35		

Material Required for Examination None

Question Source: New **Question Modification Method:**

Question Source Comments:

Comment Type	Comment

Record Number: 72 **RO Number:** 58 **SRO Number:**

Question Topic	AREA RADIATION MONITORING

A Surveillance is being performed on FHB Incident Monitor 1AR055 to check interlock functions. The Background reading for this monitor is currently:
5 X 10E-7 mr/hr.

Adjusting the ___(1)___ setpoint to ___(2)___, will cause the interlock actions to occur.

___(1)___ ___(2)___

a. ALERT 5 X 10E-6

b. HIGH 5 X 10E-8

c. ALERT 5 X 10E-8

d. HIGH 5 X 10E-6

Answer	Exam Level	Cognitive Level	Facility:	ExamDate:
b	R	Application	Braidwood	10/29/01

Tier:	RO Group	SRO Group
Plant Systems	1	1

072	Area Radiation Monitoring System		
A4.	Ability to manually operate and/or monitor in the control room:		
A4.01	Alarm and interlock setpoint checks and adjustments	3.0*	3.3

Explanation of Answer: B. Correct. Lowering the High Alarm setpoint to below background will cause the interlock function. Lowering the Alert setpoint will have no effect. 10E-8 is < 10E-7.

Reference Title	Facility Reference Number	Section	Page Number(s)	Revision	L. O.
'orse Notes - Rad monitoring	AR-1 Rad monitor notes	Area Rad monitors		0	
Alarm Response Procedures	BwOP AR/PR-11A14	B	1		
Alarm Response Procedure	BAR RM11-4-0AR55J			1	

Material Required for Examination	none

Question Source:	New	Question Modification Method:	

Question Source Comments:	

Comment Type	Comment

Record Number:	RO Number:	SRO Number:
73	59	

Question Topic AREA RADIATION MONITORING

An engineer has submitted a work request to RELOCATE Area Rad Monitor 0AR039, (Fuel Handling Building Crane rad monitor) to facilitate refueling operations.

/hich ONE of the following describes the MINIMUM required qualifications of the person PREPARING the unreviewed safety question paperwork?

a. Licensed Operator AND 50.59 qualified.

b. Licensed Operator qualified ONLY.

c. 50.59 qualified ONLY.

d. SRO Licensed Operator AND 50.59 qualified.

Answer c **Exam Level** S **Cognitive Level** Memory **Facility:** Braidwood **ExamDate:** 10/29/01

Tier: Plant Systems **RO Group** 1 **SRO Group** 1

072 Area Radiation Monitoring System

2.2 Equipment Control

2.2.8 Knowledge of the process for determining if the proposed change, test, or experiment involves an unreviewed safety question. 1.8 3.3

Explanation of Answer Per the reference, the required qualifications are the same as answer C. There is no requirement to have any type of license.

Reference Title	Facility Reference Number	Section	Page Number(s)	Revision	L. O.
10CRF50.59 Safety Evaluation Process	LS-AA-999	2.2	9	0	

aterial Required for Examination none

Question Source: New **Question Modification Method:**

Question Source Comments:

Comment Type	Comment

Record Number: 74 **RO Number:** **SRO Number:** 53

Question Topic PROCESS RADIATION MONITORING

The following conditions exist on unit 2:

- 100% Reactor power.
- The "0" CC Heat Exchanger is in service with the 2A Component Cooling pump running.
- The In-service Letdown Heat Exchanger (2A) has developed a tube leak.
- All other systems are functioning NORMALLY.

Which ONE of the following predicts the response of the Component Cooling System to these conditions?

a. When 0RE-PR009 reaches the HIGH Alarm setpoint, BOTH Units CC SURGE TANK Vent valves (1/2CC017) will CLOSE.

b. When 0RE-PR009 reaches the HIGH Alarm setpoint, ONLY Unit 2 CC SURGE TANK Vent valve (2CC017) will CLOSE.

c. When Unit 2 CC Surge Tank Level DECREASES to 50%, AUTO Makeup will occur from the Primary Water System.

d. When Unit 2 CC Surge Tank Level INCREASES to 60%, Unit 2 CC SURGE TANK Vent valve (2CC017) will CLOSE.

Answer a **Exam Level** B **Cognitive Level** Comprehension **Facility:** Braidwood **ExamDate:** 10/29/01

Tier: Plant Systems **RO Group** 2 **SRO Group** 2

073 Process Radiation Monitoring System

A1. Ability to predict and/or monitor changes in parameters associated with operating the Process Radiation Monitoring System controls including:

A1.01 Radiation levels 3.2 3.5

Explanation of Answer A. Correct. Both vent valves isolate on the Common hx outlet high rad signal, no matter which unit the common hx is aligned to. B. Incorrect, Both would isolate. C. Incorrect, Tank level will increase, not decrease at the given conditons. Decreasing to 50% would cause makeup from WM first, not PW. D. Incorrect, Tank Level is not an input to valve closure logic.

Reference Title	Facility Reference Number	Section	Page Number(s)	Revision	L.O.
Horse Notes. Rad Monitors	AR-1, Rad Monitors	Process Rad monjitors		0	
RM-11 Alarm Response	BwAR 1-0PR09J	B	1	1E1	
Radiation Monitors Ch 49	I1-AR-XL-01 Ch 49	II.C.2.e	13	7	4.b.2),5

Material Required for Examination none

Question Source: Previous 2 NRC Exams **Question Modification Method:** Concept Used

Question Source Comments: Changed premise. Changed 2 distractors.

Comment Type	Comment

Record Number: 75 **RO Number:** 60 **SRO Number:** 54

Question Topic	PROCESS RADIATION MONITORING

An approved release is ocurring from the release tank to the river.

Which ONE of the following lists the rad monitors that indicate activity levels during the release?

a. 1/2PR08J S/G Blowdown monitor AND
0PR10J Station Blowdown monitor.

b. 1/2PR08J S/G Blowdown monitor AND
0PR16J Blowdown After Filter monitor.

c. 0PR01J Liquid Radwaste Effluent monitor AND
0PR16J Blowdown After Filter monitor.

d. 0PR01J Liquid Radwaste Effluent monitor AND
0PR10J Station Blowdown monitor .

Answer:	d	Exam Level	B	Cognitive Level	Memory	Facility:	Braidwood	ExamDate:	10/29/01

Tier:	Plant Systems	RO Group	2	SRO Group	2

073	Process Radiation Monitoring System		
A4.	Ability to manually operate and/or monitor in the control room:		
A4.01	Effluent release	3.9	3.9

Explanation of Answer	A , B, and C. Incorrect, 1/2PR08J, 0PR16J do not montor the release. D. Correct.

Reference Title	Facility Reference Number	Section	Page Number(s)	Revision	L. O.
Radmonitor Interlock Function Table	BwOP AR/PR-11T1		1	8	

Material Required for Examination	none

Question Source:	Other Facility	Question Modification Method:	Concept Used

Question Source Comments:	2000 Millstone NRC. Changed to braidwood monitors. Changed answer and distractors.

Comment Type	Comment

Record Number:	76	RO Number:	61	SRO Number:	55

Question Topic	STATION AIR SYSTEM

What is the MAXIMUM pressure in the Instrument Air header that would require a start of a Station Air Compressor by using bottled Nitrogen?

a. 8 psig.

b. 28 psig.

c. 58 psig.

d. 78 psig.

Answer	b	Exam Level	R	Cognitive Level	Memory	Facility:	Braidwood	ExamDate:	10/29/01

Tier:	Plant Systems	RO Group	2	SRO Group	2

079	Station Air System		
K1.	Knowledge of the physical connections and/or cause-effect relationships between Station Air System and the following:		
K1.01	IAS	3.0	3.1

Explanation of Answer: Per the note and step in the reference, must have > 28 psig IA header pressure for proper control air to start the SAC, or else the procedure directs usage of bottled nitrogen. B. Correct. A. Incorrect. Having 8 psig IA header pressure would require the use of bottled N2, but 8 psig is not the maximum pressure as the question asks. C and D Incorrect. At these pressures, there is enough header pressure for proper control air pressure vice having to use N2.

Reference Title	Facility Reference Number	Section	Page Number(s)	Revision	L. O.
Loss of Instrument Air	0BwOA SEC-4	Step 2, and Note	2	3	

Material Required for Examination	None

Question Source:	New	Question Modification Method:	

Question Source Comments:	

Comment Type	Comment

Record Number:	77	RO Number:	62	SRO Number:	

Question Topic	FIRE PROTECTION SYSTEM

Which ONE of the following indications on the Main Control Room Fire Detection Panel (1PM09J) will alert the control room operators to a FIRE in a specific zone?

a. AMBER "Trouble Wire Open" light LIT.

b. AMBER "Trouble" light LIT.

c. RED "Fire Wire Open" light LIT.

d. RED "Fire" light LIT.

Answer	d	Exam Level	B	Cognitive Level	Memory	Facility:	Braidwood	ExamDate:	10/29/01

Tier:	Plant Systems	RO Group	2	SRO Group	2

086	Fire Protection System		
K4.	Knowledge of Fire Protection System design feature(s) and or interlock(s) which provide for the following:		
K4.03	Detection and location of fires	3.1	3.7

Explanation of Answer: A. Incorrect, indicates loss of current or open in the trouble wirng between the PA39/49J panel and the 9J panel. B. Incorrect, indicates loss of current or open between the detector and the 39/49J panel. C. Incorrect, The light is Amber (not red) indicates loss of current or open in the fire alarm wiring between the 39/49J panel and the 9J panel. D. Correct.

Reference Title	Facility Reference Number	Section	Page Number(s)	Revision	L. O.
Interpretation of Fire Protection Panel Alarms	BwOP FP-49	F.1	2	1	
Horse Note Fire Protection	FP-1				

Material Required for Examination	None

Question Source:	New	Question Modification Method:	

Question Source Comments:	

Comment Type	Comment

Record Number:	78	RO Number:	63	SRO Number:	56

Question Topic	CONTAINMENT SYSTEM

Given the following conditions on Unit 1:

- 100% Reactor power, all controls in AUTOMATIC.
- 10 minutes ago, an inadvertent Containment Isolation Phase A Signal occurred.
- No operator actions have been taken yet.

Which ONE of the following is occurring?

a. Pressurizer Level is DECREASING.

b. Pressurizer Pressure is INCREASING.

c. Seal Return is going to the RECYCLE HOLD UP TANK.

d. Letdown Flow is going to the PRESSURIZER RELIEF TANK.

Answer	b	Exam Level	B	Cognitive Level	Comprehension	Facility:	Braidwood	ExamDate:	10/29/01
Tier:	Plant Systems	RO Group	3	SRO Group	2				

103	Containment System		
A3.	Ability to monitor automatic operations of the Containment System including:		
A3.01	Containment isolation	3.9	4.2

Explanation of Answer: A. Incorrect, letdown isolates, charging flow is still adding mass to the RCS increasing Pzr level. B. Correct, as level increases, Pzr bubble is compressed, pressure increases. Sprays don't open because air is isolated on phase A. C. Incorrect, Seal Return is going to the PRT not the HUT. D. Incorrect, Letdown is isolated at the Letdown Isolation valves which close because of loss of air due to phase A.

Reference Title	Facility Reference Number	Section	Page Number(s)	Revision	L. O.
...rse Notes	SA/IA-2 SA/IA Notes			1	
Lesson Plan for Recovery from Inadvertant Phase A Containment Isolation	1BwOA PRI-13 I1-OA-XL-23	II.A	2	55, 4	3

Material Required for Examination	none

Question Source:	New	Question Modification Method:	

Question Source Comments:	

Comment Type	Comment

Record Number:	79	RO Number:	64	SRO Number:	57

Question Topic CONTINUOUS ROD WITHDRAWAL

The following conditions exist on Unit 1:

- 100% Reactor power and ALL surveillance requirements are current.

- A malfunction in the Rod Control circuitry caused a continuous rod bank withdrawal.
- Control rod motion was stopped by placing the ROD BANK SELECT SWITCH in Shutdown Bank D.

The PRIORITY level of the work request written to correct this issue is . . .

a. A, and Rods are OPERABLE.

b. A, and Rods are INOPERABLE.

c. B3, and Rods are OPERABLE.

d. B3, and Rods are INOPERABLE.

Answer a **Exam Level** S **Cognitive Level** Application **Facility:** Braidwood **ExamDate:** 10/29/01

Tier: Emergency and Abnormal Plant Evolutions **RO Group** 2 **SRO Group** 1

001 Continuous Rod Withdrawal

2.2 Equipment Control

2.2.19 Knowledge of maintenance work order requirements. 2.1 3.1

Explanation of Answer A. Correct, this problem requires immediate attention to prevent further deterioration of plant conditons, and the rods are still trippable/operable. B,C, and D Incorrect, rods are operable, and the work is more urgent than a five week start time for a B3 classification.

Reference Title	Facility Reference Number	Section	Page Number(s)	Revision	L. O.
Work Screening and Classification	WC-AA-101	2.19	4	5	
Uncontrolled Rod Motion	1BwOA ROD-1	Steps 2,5	3,4,7	54	

Material Required for Examination none

Question Source: New **Question Modification Method:**

Question Source Comments:

Comment Type	Comment

Record Number: 80 **RO Number:** **SRO Number:** 58

Question Topic Continuous Rod Withdrawal

With Unit 1 operating at 88% power, the following symptoms occur:

- Reactor power INCREASING.
- Tave GREATER THAN Tref.
- Pressurizer Pressure INCREASING.
- Pressurizer Level INCREASING.

Which ONE of the following would cause the above symptoms to occur INITIALLY?

a. Uncontrolled rod withdrawal.

b. Impulse Channel 1PT-505 Failed LOW.

c. Failed OPEN SG safety valve.

d. Power range channel N-43 fails high.

Answer a **Exam Level** B **Cognitive Level** Comprehension **Facility:** Braidwood **ExamDate:** 10/29/01

Tier: Emergency and Abnormal Plant Evolutions **RO Group** 2 **SRO Group** 1

001 Continuous Rod Withdrawal

AK1. Knowledge of the operational implications of the following concepts as they apply to Continuous Rod Withdrawal:

AK1.06 Relationship of reactivity and reactor power to rod movement 4.0 4.2

Explanation of Answer A. Correct, a constant addition of positive reactivity will raise reactor power, Tave, PZR pressure, and PZR level will increase due to increasing Tave. B. Incorrect, Pimp failing low will cause rods to insert, lowering Tave , pressure and level. C. Incorrect, although an increase in steam flow will increase reactor power, it will initially decrease Tave, level and pressure due to cooldown. D. Incorrect, a failing power range high will drive rods inward, adding negative reactivity, decreasing Tave, level, and pressure.

Reference Title	Facility Reference Number	Section	Page Number(s)	Revision	L. O.
Alarm Response Procedure	BwAR 1-14-E2	A.1	1	6	

Material Required for Examination None

Question Source: Other **Question Modification Method:** Concept Used

Question Source Comments: 1996 Braidwood 1 NRC exam. Changed 2 distractors.

Comment Type	Comment

Record Number: 81 **RO Number:** 65 **SRO Number:** 59

Question Topic	DROPPED CONTROL ROD

The following conditions exist on Unit 1:

- The Rod Drive shaft disconnected from a Control Bank B Rod.
- The RCCA has fully inserted into the fuel assembly guide tubes.

The location of the dropped rod may be determined by observing a/an . . .

a. Localized DECREASE in the CETC nearest the affected fuel assembly.

b. Localized INCREASE in the CETC nearest the affected fuel assembly.

c. Abnormal INCREASE in ONLY ONE power range detector.

d. Abnormal DECREASE in ALL power range detectors.

Answer	a	Exam Level	S	Cognitive Level	Comprehension	Facility:	Braidwood	ExamDate:	10/29/01

Tier:	Emergency and Abnormal Plant Evolutions	RO Group	2	SRO Group	1

003	Dropped Control Rod		
AA2.	Ability to determine and interpret the following as they apply to Dropped Control Rod:		
AA2.05	Interpretation of computer in-core TC map for dropped rod location	2.5*	3.2

Explanation of Answer: A. Correct, the insertion of a rod will add negative reactivity to that location causing a local flux depression and temperature decrease. B. Incorrect, localized temperature decreases. C. Incorrect, flux depression in one area will slightly raise the flux in the other 3 quadrants. D. Incorrect, the depression of the flux in one area, will cause it to increase in the other 3 areas.

Reference Title	Facility Reference Number	Section	Page Number(s)	Revision	L. O.
Inadequate Core Cooling Ch 34B sys desc	ch 34b				

Material Required for Examination	none

Question Source:	New	Question Modification Method:	

Question Source Comments:	

Comment Type	Comment

Record Number:	82	RO Number:		SRO Number:	60

Question Topic Dropped Control Rod

The following conditons exist on Unit 1:

- 100% Reactor power.
- Control Band D rod height 216 steps.
- All system controls in automatic.
- All operating conditions NORMAL.
- All Governor Valves are 100% OPEN.
- 1260 MWe output from the turbine generator.

A Control Bank D rod drops into the core.

Turbine Generator MWe will . . .

a. INCREASE due to Impulse Pressure increasing as the Governor Valves throttle closed.

b. DECREASE due to a drop in Steam Pressure, then the Throttle Valves will return MWe to 1260.

c. REMAIN at 1260 due to the DEHC IMP feedback loop in service.

d. DECREASE due to a drop in Steam Pressure, and remain there until the rod is recovered.

Answer d **Exam Level** B **Cognitive Level** Comprehension **Facility:** Braidwood **ExamDate:** 10/29/01

Tier: Emergency and Abnormal Plant Evolutions **RO Group** 2 **SRO Group** 1

003 Dropped Control Rod

AK1. Knowledge of the operational implications of the following concepts as they apply to Dropped Control Rod:

AK1.01 Reason for turbine following reactor on dropped rod event 3.2 3.7

Explanation of Answer A dropped rod adds negative reactivity, and causes a decrease in Tave and steam pressure. A. Incorrect, the GVs are already near 100% open and will try to open more to recover load. B. Incorrect, although load will decrease it will not recover because there is no further room in the GVs and the Throttle valves are already at 100% open. C. Incorrect, the feedback loop will attempt to open the GVs, but they are already passing all the steam they can. D. Correct, as Tave drops, steam pressure drops, steam flow to the turbine is already at maximum, MWe load decreases and stays there until Tave and steam presure can be raised by recovering the rod.

Reference Title	Facility Reference Number	Section	Page Number(s)	Revision	L. O.
DEHC sys decs ch 37a	ch 37a				
Dropped Rod	1BwOA ROD-3	B	1	100	

Material Required for Examination None.

Question Source: New **Question Modification Method:**

Question Source Comments:

Comment Type	Comment

Record Number: 83 **RO Number:** 66 **SRO Number:** 61

Question Topic	Inoperable/Stuck Control Rod

The following conditions exist on Unit 1:

- 50% Reactor power.
- A Control Bank C rod has become stuck.
- The affected rod has been electrically aligned for attempted recovery.
- The Rod Bank Select switch is in the "CB C" position.

When the IN-HOLD-OUT switch is moved to OUT, what will be the indicated rod speed?

a. 0 spm.

b. 8 spm.

c. 48 spm.

d. 64 spm.

Answer	c	Exam Level	B	Cognitive Level	Comprehension	Facility:	Braidwood	ExamDate:	10/29/01

Tier:	Emergency and Abnormal Plant Evolutions	RO Group	1	SRO Group	1

005	Inoperable/Stuck Control Rod		
AA1.	Ability to operate and / or monitor the following as they apply to Inoperable/Stuck Control Rod:		
AA1.01	CRDS	3.6	3.4

Explanation of Answer: A. Incorrect, plausible if using a SD rod vice a Control rod. B. Incorrect, this is the indication when no rod motion is occuring. C. Correct. D. Incorrect, this is the speed of the SD banks, but only SD A and SD B indicate as such.

Reference Title	Facility Reference Number	Section	Page Number(s)	Revision	L. O.
.orse Notes- Rod Control ch 28	RD-2 Reactor Control Unit	Rod speed		3	
Rod Control system desc	ch 28				

Material Required for Examination	None

Question Source:	New	Question Modification Method:	

Question Source Comments:	

Comment Type	Comment

Record Number:	84	RO Number:	67	SRO Number:	62

Question Topic	REACTOR TRIP

Unit 1 is at 18% getting ready to synchronize the main generator to the grid. A Loss of Offsite Power occurs. The following indications are noted immediately:

- All Power Range NIS indicated 0%.
- IR SUR indication is -0.3 dpm.
- All DRPI lights are out.
- RTB is CLOSED.
- RTA is OPEN.
- BYA and BYB are racked out.
- RTB remained CLOSED after the operators initiated a manual reactor trip from 1PM05J and 1PM06J.

Which ONE of the following actions should the crew take?

a. GO TO 1BwFR-S.1, NUCLEAR POWER GENERATION ATWS.

b. CONTINUE IN 1BwEP-0, REACTOR TRIP OR SAFETY INJECTION.

c. GO TO 1BwFR-S.2, RESPONSE TO LOSS OF CORE SHUTDOWN.

d. GO TO 1BwCA-0.0, LOSS of ALL AC POWER.

Answer	Exam Level	Cognitive Level	Facility	ExamDate
b	S	Memory	Braidwood	10/29/01

Tier	RO Group	SRO Group
Emergency and Abnormal Plant Evolutions	2	2

007	Reactor Trip		
EA2.	Ability to determine and interpret the following as they apply to Reactor Trip:		
\2.02	Proper actions to be taken if the automatic safety functions have not taken place	4.3	4.6

Explanation of Answer: B. Correct. Per reference, continuing in E-0 is appropriate unless IR SUR is less negative than -0.3 or power range channels are > 5%. A loss of offsite power is not entry conditions for loss of all AC. A. C. D. Incorrect.

Reference Title	Facility Reference Number	Section	Page Number(s)	Revision	L. O.
Reactor Trip or SI	1BwEP-0	Step 1	3	1a WOG 1C	
	1BEP-0	Step 1	3	101, WOG 1C	

Material Required for Examination: none

Question Source	Other Facility	Question Modification Method	Significantly Modified

Question Source Comments: 2001 DC Cook NRC exam

Comment Type	Comment

Record Number	RO Number	SRO Number
85		63

Question Topic Pressurizer Vapor Space LOCA

A Large Vapor Space LOCA occurred on Unit 1.
The crew has implemented the appropriate emergency procedures and is currently in 1BwEP-1, Loss of Reactor or Secondary Coolant.
The STA is monitoring Status Trees.
The following indications are observed in the Main Control Room:

- Train 'A' CETCs indicate 720 degrees F.
- Train 'B CETCs are de-energized.
- Thermocouple Map Display on CRT #2 indicates Average CETCs at 730 degrees F.
- RVLIS indicates 15% in the Plenum.
- RCS Pressure is 350 psig.

Core Cooling is ____(1)____ and will be ensured by ___(2)___.

	(1)	(2)
a.	ADEQUATE	1BwEP-1, Loss of Reactor or Secondary Coolant
b.	SATURATED	1BwFR-C.3, Response to Saturated Core Cooling
c.	DEGRADED	1BwFR-C.2, Response to Degraded Core Cooling
d.	INADEQUATE	1BwFR-C.1, Response to Inadequate Core Cooling

Answer c **Exam Level** S **Cognitive Level** Comprehension **Facility:** Braidwood **ExamDate:** 10/29/01

Tier: Emergency and Abnormal Plant Evolutions **RO Group** 2 **SRO Group** 2

08 Pressurizer Vapor Space Accident

AA2. Ability to determine and interpret the following as they apply to Pressurizer Vapor Space Accident:

AA2.16 RCS in-core thermocouple indicators; use of plant computer for interpretation 3.8 4.1

Explanation of Answer Given conditions present an ORANGE path on the status tree. The correct procedure is C.2. A. Incorrect, ORANGE path overrides EP-1. B. Incorrect, conditions are Degraded, (beyond saturated). C. Correct. D. Incorrect, CETCs are not > 1200.

Reference Title	Facility Reference Number	Section	Page Number(s)	Revision	L. O.
Status Tree.	1BwST-2	Tree	1	1, WOG 1C	

Material Required for Examination 1BwST-2 rev 1 WOG 1C

Question Source: New **Question Modification Method:**

Question Source Comments:

Comment Type	Comment

Record Number: 86 **RO Number:** **SRO Number:** 64

Question Topic Small Break LOCA

Given the following Unit 1 conditions:

- A small break LOCA is in progress.
- SI has actuated.
- All sytems and automatic actions are operating as expected.

Which ONE of the following is the reason for maintaining a secondary heat sink?

a. To ensure removal of RCS heat if any RCPs are still running.

b. RCS pressure may remain so high that cooling from injection flow alone is inadequate.

c. Reflux boiling is the primary means of heat removal prior to voiding in the hot legs.

d. To provide an alternate means of RCS pressure control.

Answer b **Exam Level** B **Cognitive Level** Memory **Facility:** Braidwood **ExamDate:** 10/29/01

Tier: Emergency and Abnormal Plant Evolutions **RO Group** 2 **SRO Group** 2

009	Small Break LOCA		
EK2.	Knowledge of the interrelations between Small Break LOCA and the following:		
EK2.03	S/Gs	3.0	3.3

Explanation of Answer A. Incorrect, RCPs are not necessary to transfer heat to the SGs. B. Correct, heat removal via the SGs will enable RCS depressurization to allow greater injection flow from SI and CV pumps. C. Incorrect, reflux boiling occurs after voiding in the hot legs. D. Incorrect, RCS pressure control is via Heaters/Sprays or Pzr Porvs, or Aux spray.

Reference Title	Facility Reference Number	Section	Page Number(s)	Revision	L. O.
?G Background doc E-1			5,12	HP 1	

Material Required for Examination None

Question Source: Other **Question Modification Method:** Direct From Source

Question Source Comments: ANO 1998 NRC Exam.

Comment Type	Comment

Record Number: 87 **RO Number:** 68 **SRO Number:** 65

Question Topic LARGE BREAK LOCA

Unit 1 has tripped and the following conditions are noted:

- Containment Pressure is INCREASING rapidly.
- Pressurizer Level has DECREASED and is OFF SCALE LOW.
- Pressurizer Pressure Indications are 1700 psig.
- Subcooling Margin Monitor Indicates 0 degrees F.
- SG levels are STABLE in the Narrow Range.

Which ONE of the following diagnoses the accident that has occurred and identifies the procedure to be utilized?

a. Large Steam Generator Tube Rupture, 1BwEP-3 Steam Generator Tube Rupture.

b. Large Break Loss of Reactor Coolant, 1BwEP-1 Loss of Reactor or Secondary Coolant.

c. Faulted Steam Generator inside containment, 1BwEP-2 Faulted Steam Generator Isolation.

d. Pressurizer Vapor Space Loss of Coolant, 1BwEP-1 Loss of Reactor or Secondary Coolant.

Answer b **Exam Level** S **Cognitive Level** Comprehension **Facility:** Braidwood **ExamDate:** 10/29/01

Tier: Emergency and Abnormal Plant Evolutions **RO Group** 2 **SRO Group** 1

011 Large Break LOCA

EA2. Ability to determine and interpret the following as they apply to Large Break LOCA:

EA2.04 Significance of PZR readings 3.7 3.9

Explanation of Answer A. Incorrect, because the affected SG level would not be stable and Cnmt pressure would not increase rapidly. B. Correct, meets all indications. C. Incorrect, SMM would be increasing due to lowering RCS temperatures, and SG level in the affected SG would not be stable. D. Incorrect, Pzr level would increase from ECCS flow and insurge towards the break.

Reference Title	Facility Reference Number	Section	Page Number(s)	Revision	L. O.
Reactor Trip or SI lesson plan	EP-XL-01	I.B.3.b)3)	6	12	6
Loss of Reactor or Secondary Coolant LP	EP-XL-02				9.a

Material Required for Examination None

Question Source: Previous 2 NRC Exams **Question Modification Method:** Editorially Modified

Question Source Comments: Changed distractor from failed open Pzr Safety, to Vapor space LOCA.

Comment Type	Comment

Record Number: 88 **RO Number:** **SRO Number:** 66

Question Topic	RCP MALFUNCTIONS

Which of the following RCP malfunctions would be expected to cause an increase in RCP motor amps?

a. Loss of Seal Injection.

b. Loss of Thermal Barrier flow.

c. Sheared RCP shaft.

d. Thrust Bearing failure.

Answer	d	Exam Level	B	Cognitive Level	Comprehension	Facility:	Braidwood	ExamDate:	10/29/01

Tier:	Emergency and Abnormal Plant Evolutions	RO Group	1	SRO Group	1

015	Reactor Coolant Pump Malfunctions		
AK2.	Knowledge of the interrelations between Reactor Coolant Pump Malfunctions and the following:		
AK2.10	RCP indicators and controls	2.8*	2.8

Explanation of Answer: A. Incorrect, a loss of seal injection will increase seal temperatures, not motor amps. B. Incorrect, a loss of thermal barrier flow will increase lower radial bearing temperatures and seal outlet temperatures, not motor amps. C. Incorrect, a shaft shear will decrease motor amps. D. Correct, thrust bearing failure will increase the resistance to rotation, causing greater current draw.

Reference Title	Facility Reference Number	Section	Page Number(s)	Revision	L. O.
RCP Ch 13 lesson plan	I1-RC-XL-02		10		

Material Required for Examination	None

Question Source:	Other	Question Modification Method:	Direct From Source

Question Source Comments:	INPO exam bank.

Comment Type	Comment

Record Number:	89	RO Number:	69	SRO Number:	67

Question Topic RCP MALFUNCTIONS LOSS OF FLOW

Given the following Unit 2 Conditions:

- Unit 2 is in Mode 3, at NOT and NOP.
- 1B RCP Trips.

What happened to loop flow and core flow as a result of the RCP trip?

With THREE RCPs running, the active loops TOTAL flow is . . .

a. 3/4 of the value for FOUR RCPs, and flow through the core is 3/4 of the value for FOUR RCPs.

b. 3/4 of the value for FOUR RCPs, and flow through the core is LESS THAN 3/4 of the value for FOUR RCPs.

c. GREATER THAN 3/4 of the value for FOUR RCPs, and flow through the core is LESS THAN 3/4 of the value for FOUR RCPs.

d. LESS than 3/4 of the value for FOUR RCPs, and flow through the core is LESS THAN 3/4 of the value for FOUR RCPs.

Answer c **Exam Level** B **Cognitive Level** Comprehension **Facility:** Braidwood **ExamDate:** 10/29/01

Tier: Emergency and Abnormal Plant Evolutions **RO Group** 1 **SRO Group** 1

017 Reactor Coolant Pump Malfunctions (Loss of RC Flow)

AA1. Ability to operate and / or monitor the following as they apply to Reactor Coolant Pump Malfunctions (Loss of RC Flow):

AA1.12 Reactor coolant loop flow meters 2.8* 3.1

Explanation of Answer C. Correct. Stopping one of four running RCPs, reduces the head which the remaining running pumps must operate against. This increases individual pump flows. Summing each running pump's flow yields greater than 3/4 of what four pumps can individually produce. However, due to backflow in the idle loop, some additional flow bypasses the core, reducing core flow by more than 1/4.

Reference Title	Facility Reference Number	Section	Page Number(s)	Revision	L.O.
RCP Ch 13 lesson plan	I1-RC-XL-02		35, 36		

Material Required for Examination None

Question Source: Other **Question Modification Method:** Direct From Source

Question Source Comments: Braidwood 1997 NRC exam.

Comment Type	Comment

Record Number: 90 **RO Number:** 70 **SRO Number:** 68

Question Topic RCP MALFUNCTIONS LOSS OF FLOW

The following conditions exist on Unit 1:

- A Large Break LOCA has occurred.
- All RCPs are stopped.
- ECCS and ESF systems functioned as designed.
- RCS pressure equals Containment pressure.
- The operating crew is ready to transition out of 1BwEP-0, REACTOR TRIP OR SAFETY INJECTION.

RCP #1 Seal Leakoff is . . .

a. OCCURRING and flowing to the Pressurizer Relief Tank.

b. OCCURING and flowing to the Volume Control Tank.

c. OCCURRING and flowing to the Reactor Coolant Drain Tank.

d. NOT OCCURRING.

Answer d **Exam Level** B **Cognitive Level** Comprehension **Facility:** Braidwood **ExamDate:** 10/29/01

Tier: Emergency and Abnormal Plant Evolutions **RO Group** 1 **SRO Group** 1

017 Reactor Coolant Pump Malfunctions (Loss of RC Flow)

AK2. Knowledge of the interrelations between Reactor Coolant Pump Malfunctions (Loss of RC Flow) and the following:

AK2.07 RCP seals 2.9 2.9

Explanation of Answer D. Correct. On a LBLOCA, Containment Isolation signals stop seal return flow. The depressurization of the RCS due to the LBLOCA will allow any incoming flow to the RCPs to go into the RCS. The VCT, PRT, and RCDT are all possible leakoff paths for other seals or smaller breaks or accidents.

Reference Title	Facility Reference Number	Section	Page Number(s)	Revision	L.O.
Horse Notes CVCS ch 15a	CV-1, CVCS			4	
Inadvertent Phase A	1BwOA PRI-13		5,8,9	55	

Material Required for Examination None

Question Source: New **Question Modification Method:**

Question Source Comments:

Comment Type	Comment

Record Number: 91 **RO Number:** 71 **SRO Number:** 69

Question Topic	LOSS OF REACTOR COOLANT MAKEUP

Which ONE of the following will render the Boric Acid Storage Tank INOPERABLE during Mode 1 operations?

a. Tank Temperature 40 degrees F and Level 65%.

b. Tank Temperature is 65 degrees F and Level is 40%.

c. Boron concentration is 7100 ppm and temperature is 65 degrees F.

d. Boron Concentration is 7000 ppm and Level is 40%.

Answer	**Exam Level**	**Cognitive Level**	**Facility:**	**ExamDate:**
a	R	Memory	Braidwood	10/29/01

Tier:	**RO Group**	**SRO Group**
Emergency and Abnormal Plant Evolutions	2	2

022	Loss of Reactor Coolant Makeup		
2.2	Equipment Control		
2.2.12	Knowledge of surveillance procedures.	3.0	3.4

Explanation of Answer: Per the reference, temperature must be at least 65 degrees F, level must be at least 40%, and boron must be at least 7000 ppm. A. Correct, temp is too low. B, C, and D all meet the surveilance requirements.

Reference Title	Facility Reference Number	Section	Page Number(s)	Revision	L. O.
TRM Borated Water Sources Operating	TRM 3.1.f	TSR 3.1.f 1,2,3	3.1f-2	1	

Material Required for Examination: None

Question Source: New

Question Modification Method:

Question Source Comments:

Comment Type	Comment

Record Number: 92 **RO Number:** 72 **SRO Number:**

Question Topic	LOSS OF RHR

The following conditions and indications are present on Unit 1:

- RCS Temperature is 300 degrees F.
- Wide range RCS pressure is 300 psig.
- 1A RH Train is in a Shutdown Cooling alignment.
- 1A RH pump current has started oscillating.
- 1A RH pump discharge pressure has started fluctuating.
- 1A RH loop temperature has started to INCREASE.

Which ONE of the following valve indications will lead the operator to the problem?

a. 1RH8701A, RC Loop 1A to RH pump 1A Suction Isol valve OPEN light Lit.

b. 1RH8701B, RC Loop 1A to RH pump 1A Suction Isol valve CLOSED light Lit.

c. 1RH8716A, 1A RH Discharge Header X-Tie valve OPEN light Lit.

d. 1SI8809A RH to Cold Legs 1A and 1D Isol Valve CLOSED light Lit.

Answer	Exam Level	Cognitive Level	Facility:	ExamDate:
b	B	Comprehension	Braidwood	10/29/01

Tier:	RO Group	SRO Group
Emergency and Abnormal Plant Evolutions	2	2

025	Loss of Residual Heat Removal System		
AA1.	Ability to operate and / or monitor the following as they apply to Loss of Residual Heat Removal System:		
AA1.10	LPI pump suction valve and discharge valve indicators	3.1*	2.9

Explanation of Answer: B. Correct/ A. Incorrect. 8701A and B are in series in the suction path to the operating RH pump. Closing either will cause all the indications given. C. Incorrect. An open discharge header cross tie will not cause the indications given. D. Incorrect. A closed discharge valve will cause the temperature to increase, but not the other indications.

Reference Title	Facility Reference Number	Section	Page Number(s)	Revision	L. O.
Placing the RH system in shutdown cooling	BwOP RH-6	E. 8, 9, 10	4, 5	23	
Loss of RH Cooling	1BwOA PRI-10	B.2	1	100	

Material Required for Examination	none

Question Source:	New	Question Modification Method:	

Question Source Comments:	

Comment Type	Comment

Record Number:	93	RO Number:	73	SRO Number:	70

Question Topic LOSS OF RHR

Given the following conditions on Unit 1:

- CETCs indicate 100 degrees F.
  RH cooling has been lost and attempts are being made to restore a RH pump.

- The following is the timeline for Unit 1 operations following a 300 day continuous run:
  - 10/1/01, 1000 Reactor Shutdown. Cooldown initiated for MAINTENANCE outage.
  - 10/4/01, 1300 Entered MODE 5.
  - 10/17/01, 2200 Operating RH pump TRIPPED.

What is the MINIMUM amount of makeup required to PREVENT BOILING in the RCS?

a. 40 gpm.

b. 60 gpm.

c. 350 gpm.

d. 500 gpm.

Answer: d **Exam Level** B **Cognitive Level** Application **Facility:** Braidwood **ExamDate:** 10/29/01

Tier: Emergency and Abnormal Plant Evolutions **RO Group** 2 **SRO Group** 2

025 Loss of Residual Heat Removal System

AK1. Knowledge of the operational implications of the following concepts as they apply to Loss of Residual Heat Removal System:

AK1.01 Loss of RHRS during all modes of operation 3.9 4.3

Explanation of Answer D. Correct. Using figure 1BwOA PRI 10-3 to determine the amount of makeup required to prevent boiling at 16.5 days after shutdown shows approximately 500 gpm. B. Incorrect. If the curve for flow required to match boiloff is used, the value is 60 gpm. C. Incorrect. If the curve is used for conditions following refueling the flow to prevent boiling is 350 gpm and the flow to match boiloff is 40 gpm (A. Incorrect). The premise states that the cooldown was for a maintenance outage.

Reference Title	Facility Reference Number	Section	Page Number(s)	Revision	L. O.
Loss of RH Cooling Unit 1	1BwOA PRI-10	Fig 10-3 and 10-4	56, 57	100	
Abnormal Operating Procedure, OA PRI-10, Loss of RH Cooling	I1-OA-XL-20	II.B. Fig	5-6	8	5

Material Required for Examination Figures 1BwOA PRI 10-3 and 10-4

Question Source: Previous 2 NRC Exams **Question Modification Method:** Editorially Modified

Question Source Comments: Braidwod 1999 NRC exam

Comment Type	Comment

Record Number: 94 **RO Number:** 74 **SRO Number:** 71

Question Topic	PZR PRESSURE CONTROL

Given the following conditions on Unit 1:

- 85% Reactor Power.
- All systems and controls are in automatic.
- 1B Main Feed Pump trips.
- 1A Main Feed Pump will NOT start.
- The OUTPUT of the PZR Master Pressure Controller is failed AS IS.
- The Unit 1 Admin NSO initiates a turbine runback.

What is the INITIAL response of the Pressurizer Pressure Control System during this event?

a. BACKUP Heaters turn OFF due to the pressure increase.

b. BACKUP Heaters turn ON to heat incoming surge volume.

c. BOTH PZR Spray valves THROTTLE OPEN to reduce pressure to normal.

d. BOTH PZR PORVs OPEN to maintain pressure below the High reactor trip setpoint.

Answer	Exam Level	Cognitive Level	Facility:	ExamDate:
b	B	Application	Braidwood	10/29/01

Tier:	RO Group	SRO Group
Emergency and Abnormal Plant Evolutions	1	2

027	Pressurizer Pressure Control Malfunction		
AK1.	Knowledge of the operational implications of the following concepts as they apply to Pressurizer Pressure Control Malfunction:		
AK1.02	Expansion of liquids as temperature increases	2.8	3.1

Explanation of Answer: During a runback, PZR level is expected to rise due to heatup of the RCS. This compresses the bubble tending to raise pressure. With the master pressure controller output failed as is, the sprays will not open any further than they already are, and PORV 1RY455A, will not respond, making answers C and D incorrect. Answer A is incorrect because the cycling of the backup heaters on pressure also comes from the output of the master pressure controller. B. Correct because a 25% runback will cause PZR level to increase ~8%. At +5% deviation all back up heaters are turned on.

Reference Title	Facility Reference Number	Section	Page Number(s)	Revision	L.O.
Pressurizer (RY) Ch. 14	I1-RY-XL-01	I.D.2 and 3	3	9	2, 5
Horse Notes	RY-1, Pressurizer RY-2,PZR Pressure Control RY-3, PZR Level Control			5, 4, 5	

Material Required for Examination	None

Question Source:	Previous 2 NRC Exams	Question Modification Method:	Significantly Modified

Question Source Comments:	Braidwood 1999 NRC exam.

Comment Type	Comment

Record Number:	RO Number:	SRO Number:
95	75	72

Question Topic	PZR PRESSURE CONTROL

The following conditons exist on Unit 1:

- 50% Reactor power.
- PZR Pressure control is in automatic
- One set of Backup heaters is in "ON".
- Actual Pzr Pressure is 2250 psia.

The Pzr Pressure Master Controller malfunctions and the SETPOINT drifts to 2100 psia over a 10 minute period.

Which ONE of the following describes the INITIAL automatic responses of the control elements of the Pzr Pressure Control System as a result of this failure?

a. Spray valves throttle open and variable heaters go to minimum current.

b. Spray valves throttle closed and variable heaters go to maximum current.

c. PORV 1RY455A opens, Spray valves throttle open, variable heaters go to minimum current.

d. PORV 1RY456 opens, Spray valves throttle open, variable heaters go to minimum current.

Answer	a	Exam Level	B	Cognitive Level	Application	Facility:	Braidwood	ExamDate:	10/29/01
Tier:	Emergency and Abnormal Plant Evolutions	RO Group	1	SRO Group	2				

027	Pressurizer Pressure Control Malfunction		
AK2.	Knowledge of the interrelations between Pressurizer Pressure Control Malfunction and the following:		
AK2.03	Controllers and Positioners	2.6	2.8

Explanation of Answer: A slow reduction of the setpoint of the master pressure controller essentially wants to control pressure at a lower setpoint. A. Correct/ B. Incorrect. Throttling open sprays and reducing variable heater current will accomplish the pressure reduction. C. Incorrect. The 10 minutes it takes to reduce the setpoint is not fast enough to cause 1RY455A to open on a rate sensitve signal. D. Incorrect. 1RY456 is not controlled by the master pressure controller.

Reference Title	Facility Reference Number	Section	Page Number(s)	Revision	L.O.
Pressurizer Ch 14.	I1-RY-XI-01				
Horse Notes	RY-2, PZR Pressure Control			4	

Material Required for Examination	None

Question Source:	Other Facility	Question Modification Method:	Concept Used
Question Source Comments:	Millstone 3 2000 NRC exam		

Comment Type	Comment

Record Number:	96	RO Number:	76	SRO Number:	73

Question Topic PZR LEVEL CONTROL MALFUNCTION

The following conditons exist on Unit 1:

- 100% Reactor power.
- All systems and controls are in AUTOMATIC.
- Pressurizer Level Control Select switch is in the 459/460 position.

What is the response of the charging pump and the resulting operability status of the pressurizer to 1LT-459 failing LOW?

Current Draw for Running Charging pump	Pressurizer Operablitiy Status

a. INCREASES — OPERABLE

b. INCREASES — INOPERABLE

c. DECREASES — OPERABLE

d. DECREASES — INOPERABLE

Answer a **Exam Level** S **Cognitive Level** Comprehension **Facility:** Braidwood **ExamDate:** 10/29/01

Tier: Emergency and Abnormal Plant Evolutions **RO Group** 3 **SRO Group** 3

028 Pressurizer Level Control Malfunction

AA2. Ability to determine and interpret the following as they apply to Pressurizer Level Control Malfunction:

AA2.04 Ammeters and running indicators for CVCS charging pumps 2.6 3.1

Explanation of Answer A. Correct. 1LT-459 controls charging and the heaters with the select switch in 459/460. When 459 fails low, L/D isolates, but in the control system 459 indicates actual level. A large level mismatch between program and actual exists requiring maximum charging. Therefore pump amps increase. Pressurizer Operability is dependent on Level < 92%, and at least 2 groups of heaters with 150 KW per group.

Reference Title	Facility Reference Number	Section	Page Number(s)	Revision	L. O.
Horse Notes- PZR Level Control	RY-3	Instrument Failures		5	
Pressurizer Ch 14 system desc	CH 14		52, fig 15		

Material Required for Examination none

Question Source: New **Question Modification Method:**

Question Source Comments:

Comment Type	Comment

Record Number: 97 **RO Number:** **SRO Number:** 74

Question Topic	PZR LEVEL CONTROL

With the Pressurizer Level Control Select switch in the 459/460 position, the ONLY Pressurizer Level Channel failure that will NOT ISOLATE letdown is Pressurizer Level Channel . . .

a. 1LT-459 failed HIGH.

b. 1LT-459 failed LOW.

c. 1LT-460 failed HIGH.

d. 1LT-460 failed LOW.

Answer	Exam Level	Cognitive Level	Facility:	ExamDate:
c	B	Comprehension	Braidwood	10/29/01

Tier:	RO Group	SRO Group
Emergency and Abnormal Plant Evolutions	3	3

028	Pressurizer Level Control Malfunction		
AK2.	Knowledge of the interrelations between Pressurizer Level Control Malfunction and the following:		
AK2.02	Sensors and detectors	2.6	2.7

Explanation of Answer

B. and D. Incorrect. A failure low of either 459 or 460 will close the associated letdown isolation valve (1CV459 or 1CV460) isolating letdown. A. Incorrect. A failure high of 459 will reduce charging to minimum, creating a charging and letdown flow mismatch. PZR level will decrease to 17% and 1CV460 will close isolating letdown. C. Correct. A high failure of 460, will not affect charging flow, nor cause closure of either letdown isolation valve.

Reference Title	Facility Reference Number	Section	Page Number(s)	Revision	L. O.
Horse Notes	RY-3 PZR Level Control	Instrument Failures		5	
Pressurizer	Ch 14 system desc		52,53		

Material Required for Examination	None

Question Source:	New	Question Modification Method:	

Question Source Comments:	

Comment Type	Comment

Record Number:	RO Number:	SRO Number:
98	77	75

Question Topic	FUEL HANDLING INCIDENTS

Limiting the magnitude of a potential release during a fuel handling accident is accomplished by limiting the maximum load traveling over the fuel assemblies in the Spent fuel Pool to LESS THAN OR EQUAL TO _______.

a. 1000 lbs.

b. 1500 lbs.

c. 2000 lbs.

d. 2500 lbs.

Answer	c	Exam Level	R	Cognitive Level	Memory	Facility:	Braidwood	ExamDate:	10/29/01

Tier:	Emergency and Abnormal Plant Evolutions	RO Group	3	SRO Group	3

036	Fuel Handling Incidents		
AA2.	Ability to determine and interpret the following as they apply to Fuel Handling Incidents:		
AA2.03	Magnitude of potential radioactive release	3.1*	4.2

Explanation of Answer	Per the reference the only correct answer is C.

Reference Title	Facility Reference Number	Section	Page Number(s)	Revision	L. O.
Refueling Operations- crane travel	TRM 3.9.d				

Material Required for Examination	None

Question Source:	Other Facility	Question Modification Method:	Direct From Source

Question Source Comments:	2001 DC Cook NRC Exam

Comment Type	Comment

Record Number:	99	RO Number:	78	SRO Number:	

Question Topic	SG TUBE LEAK

The following conditions existed on Unit 1:

- 100% Reactor power.
- Small Steam Generator Tube Leak (5 gpd) on 1A Steam Generator.
- A Shutdown has been commenced to repair the leak.

If the turbine were to trip, what is the MAXIMUM power level that the turbine could trip from that would result in the least amount of radioactive release to the environment?

a. 20%.

b. 40%.

c. 60%.

d. 80%.

Answer	b	Exam Level	B	Cognitive Level	Memory	Facility:	Braidwood	ExamDate:	10/29/01

Tier:	Emergency and Abnormal Plant Evolutions	RO Group	2	SRO Group	2

037	Steam Generator Tube Leak		
AK3.	Knowledge of the reasons for the following responses as they apply to Steam Generator Tube Leak:		
AK3.09	Maximum load change capability of facility	2.7*	3.1

Explanation of Answer: B. Correct. Steam dumps will absorb a 40% load rejection, which is essentially the situation in the question. 10% more can be absorbed by the rods. 10+40=50, but that's not a distractor. Therefore the maximum power is 40%.

Reference Title	Facility Reference Number	Section	Page Number(s)	Revision	L.O.
.orse Note- Steam Dumps	MS-4 Main Steam Dumps	Purpose		6	

Material Required for Examination	none

Question Source:	New	Question Modification Method:	

Question Source Comments:	

Comment Type	Comment

Record Number:	100	RO Number:	79	SRO Number:	76

Question Topic	SGTR

One of the criteria to stop the RCS depressurization in 1BwEP-3, Steam Generator Tube Rupture, is unacceptable subcooling.

ow does the ICONIC display indicate the value of Subcooling is UNACCEPTABLE?

The value displayed is . . .

a. CYAN.

b. WHITE.

c. YELLOW.

d. MAGENTA.

Answer	d	Exam Level	B	Cognitive Level	Memory	Facility:	Braidwood	ExamDate:	10/29/01

Tier:	Emergency and Abnormal Plant Evolutions	RO Group	2	SRO Group	2

038	Steam Generator Tube Rupture		
EA1.	Ability to operate and / or monitor the following as they apply to Steam Generator Tube Rupture:		
EA1.45	Safely parameter display system	3.9*	4.0

Explanation of Answer

There are two setpoints for the subcooling display. One for Normal Cnmt, and one for Adverse cnmt. D. Correct. When the calculated value of subcooling is < the appropriate setpoint, the color changes to magenta. A. Incorrect, only spokes can change to cyan, and subcooling is not a spoke. B. Incorrect, white is the normal display color and signifies subcooling is acceptable. C. Incorrect, only rad monitor spokes change to yellow.

Reference Title	Facility Reference Number	Section	Page Number(s)	Revision	L. O.
orse Notes- SPDS Display	CX-1	Subcooling		1	
Plant Computer lesson plan ch 56			9		

Material Required for Examination	None

Question Source:	New	Question Modification Method:	

Question Source Comments:	

Comment Type	Comment

Record Number:	101	RO Number:	80	SRO Number:	77

Question Topic	SGTR

The following indications were observed during a Steam Generator Tube Rupture just prior to tripping the Unit:

- Charging flow 140 gpm.
- Letdown flow 75 gpm.
- PZR Level steady DECREASE of 10% over 3 minutes.
- Reactor and Turbine power constant.

What is the approximate primary to secondary leakage rate?

a. 1280 gpm.

b. 480 gpm.

c. 128 gpm.

d. 65 gpm.

Answer	b	Exam Level	B	Cognitive Level	Application	Facility:	Braidwood	ExamDate:	10/29/01
Tier:	Emergency and Abnormal Plant Evolutions	RO Group	2	SRO Group	2				

038	Steam Generator Tube Rupture		
EA2.	Ability to determine and interpret the following as they apply to Steam Generator Tube Rupture:		
EA2.13	Magnitude of rupture	3.1*	3.7

Explanation of Answer

B. Correct. At 128 gal/%Pzr Level, a 10% decrease over 3 minutes is 3.33% per minute, or 427 gpm. The Charging/letdown mismatch of 65 gpm - 12 gpm seal return flow is added to this to total 480 gpm. A. Incorrect. 1280 gpm is plausible if a 10% decrease is taken at 128 gal/%. C. Incorrect. 128 gpm is plausible if 140 charging flow has 12 gpm seal return subtracted from it. D. Incorrect. 65 gpm is plausible if 140 charging flow has 75 letdown flow subtracted from it.

Reference Title	Facility Reference Number	Section	Page Number(s)	Revision	L. O.
Horse notes	RY-1, Pressurizer			5	

Material Required for Examination	None

Question Source:	New	Question Modification Method:	

Question Source Comments:	

Comment Type	Comment

Record Number:	102	RO Number:	81	SRO Number:	78

Question Topic	STEAM LINE RUPTURE

During a Unit 2 Startup, while the Unit is still in MODE 3, the operating crew observes a number of abnormal indications relative to primary and containment parameters. The crew determines the indications are signs of either a moderately sized LOCA or a moderately sized steam break.

Which ONE of the following parameters should be used to differentiate between the early stages of the two possible events?

a. Containment Pressure.

b. RCS Pressure.

c. RCS Temperature.

d. Pressurizer Level.

Answer	c	Exam Level	B	Cognitive Level	Comprehension	Facility:	Braidwood	ExamDate:	10/29/01
Tier:	Emergency and Abnormal Plant Evolutions	RO Group	1	SRO Group	1				

040	Steam Line Rupture		
AK1.	Knowledge of the operational implications of the following concepts as they apply to Steam Line Rupture:		
AK1.03	RCS shrink and consequent depressurization	3.8	4.2

Explanation of Answer: C. Correct. Although both events will cause Containment pressure to increase, and RCS pressure and Pressurizer Level to Decrease, only the steam break will have an effect on RCS Temperature.

Reference Title	Facility Reference Number	Section	Page Number(s)	Revision	L. O.
Intro to EP lesson plan		Majotr Accident ID Chart			

Material Required for Examination	None

Question Source:	Other Facility	Question Modification Method:	Direct From Source

Question Source Comments:	Salem 1996 NRC exam

Comment Type	Comment

Record Number:	103	RO Number:	82	SRO Number:	79

Question Topic LOSS OF CONDENSER VACUUM

Unit 1 is at 25% Reactor power and 300 Mwe.
1 of the 3 CD/CB running pumps TRIPPED.

he NSO reports from observation of control panel indications that the Condenser Absolute Pressure has INCREASED from 3 INCHES HGA to 4 INCHES HGA.

Which ONE of the following describes the cause of the change in condenser pressure and identifies the procedure to correct the situation?

	CAUSE	PROCEDURE to CORRECT
a.	Trip of 1 CD/CB pump	1BwOA SEC-3 Loss of Condenser Vacuum
b.	HP Turbine GS Pressure 0.2 psig	1BwOA SEC-3 Loss of Condenser Vacuum
c.	Trip of 1 CD/CB pump	1BwOA SEC-1 Secondary Pump Trip
d.	HP Turbine GS Pressure 0.2 psig	1BwOA SEC-1 Secondary Pump Trip

Answer: b **Exam Level** S **Cognitive Level** Comprehension **Facility:** Braidwood **ExamDate:** 10/29/01

Tier: Emergency and Abnormal Plant Evolutions **RO Group** 1 **SRO Group** 1

051 Loss of Condenser Vacuum

AA2. Ability to determine and interpret the following as they apply to Loss of Condenser Vacuum:

AA2.01 Cause for low vacuum condition 2.4* 2.7*

xplanation of swer A. Incorrect, GS header pressure is appropriate to supply the seal regulators. B. Correct, the seal pressure is too low, and the correct procedure is SEC-3. C, and D. Incorrect, because the procedure listed will not solve the vacuum issue.

Reference Title	Facility Reference Number	Section	Page Number(s)	Revision	L. O.
Alarm Response Procedures	BwAR 1-18-B8	setpoint, and D.5	1	5E1	
Loss Of Condenser Vacuum	1BwOA SEC-3	Symptoms B.2	1	54	

Material Required for Examination none

Question Source: New **Question Modification Method:**

Question Source Comments:

Comment Type	Comment

Record Number: 104 **RO Number:** **SRO Number:** 80

Question Topic LOSS OF CONDENSER VACUUM

Using the "Turbine Load vs Condenser Pressure" figure (1BwOA SEC-3-1) provided, determine which ONE of the following conditions requires a Reactor Trip?

MEGAWATTS	CONDENSER ABSOLUTE PRESSURE IN HGA
a. 1200	6
b. 600	7
c. 900	7
d. 400	6

Answer d **Exam Level** R **Cognitive Level** Application **Facility:** Braidwood **ExamDate:** 10/29/01

Tier: Emergency and Abnormal Plant Evolutions **RO Group** 1 **SRO Group** 1

051 Loss of Condenser Vacuum

AA2. Ability to determine and interpret the following as they apply to Loss of Condenser Vacuum:

AA2.02 Conditions requiring reactor and/or turbine trip 3.9 4.1

Explanation of Answer D. Correct. Per the figure, the only time a trip is required is when the conditons define a point in the "NOT ACCEPTABLE" region. Operation in the "MINIMZE OPERATION"(as applicable to Bwd) region do not require a trip.

Reference Title	Facility Reference Number	Section	Page Number(s)	Revision	L. O.
oss of Condenser Vacuum	1BwOA SEC-3 Figure 1BwOA SEC 3-1	Note	2 9	54	

Material Required for Examination Figure 1BwOA SEC 3-1

Question Source: New **Question Modification Method:**

Question Source Comments:

Comment Type	Comment

Record Number: 105 **RO Number:** 83 **SRO Number:**

Question Topic	ACCIDENTAL LIQUID RADWASTE RELEASE

A liquid release package is being prepared.

Who is contacted to determine the release FLOW PATH?

a. Ops Supervisor.

b. Nuclear Station Operator.

c. Radiation Protection Supervisor.

d. Chemistry Supervisor.

Answer	a	Exam Level	S	Cognitive Level	Memory	Facility:	Braidwood	ExamDate:	10/29/01

Tier:	Emergency and Abnormal Plant Evolutions	RO Group	2	SRO Group	1

059	Accidental Liquid Radwaste Release		
2.1	Conduct Of Operations		
2.1.14	Knowledge of system status criteria which require the notification of plant personnel.	2.5	3.3

Explanation of Answer: A. Correct. Per the reference, the OPS Supervisor determines the release flowpath. The rad supv and the US are also signatures on the release form, but do not determine the release flowpath.

Reference Title	Facility Reference Number	Section	Page Number(s)	Revision	L. O.
Liquid Release Tank Release Form	BwOP WX-501T1	E. Note	18	15	

Material Required for Examination	None

Question Source:	New	Question Modification Method:	

Question Source Comments:	

Comment Type	Comment

Record Number:	106	RO Number:		SRO Number:	81

Question Topic ACCIDENTAL LIQUID RADWASTE RELEASE

During a Reactor Coolant Filter change out, a small amount (~ 1 liter) of contaminated liquid escaped onto the floor. The liquid was quickly covered, contained, and cleaned up using a long handled mop. No airborne contamination resulted.

The exposure from this type of work is primarily a threat to the . . .

a. Whole Body.

b. Skin.

c. Extremities.

d. Lens of the eye.

Answer: a **Exam Level** B **Cognitive Level** Memory **Facility:** Braidwood **ExamDate:** 10/29/01

Tier: Emergency and Abnormal Plant Evolutions **RO Group** 2 **SRO Group** 1

059 Accidental Liquid Radwaste Release

AK1. Knowledge of the operational implications of the following concepts as they apply to Accidental Liquid Radwaste Release:

AK1.02 Biological effects on humans of various types of radiation, exposure levels that are acceptable for nuclear power plant personnel, and the units used for radiation-intensity measurements and for radiation exposure levels 2.6 3.2*

Explanation of Answer A. Correct. A spill of reactor coolant filter effluent liquid is primarily a Beta-Gamma source. To get any exposure from Beta, very close work is necessary since clothing and dead skin stops most Beta radiation. Beta travel in air is only 1meter at 1Mev. In this case a long handled mop was used. Therefore the dose is primarily from Gamma, which is a whole body threat.

Reference Title	Facility Reference Number	Section	Page Number(s)	Revision	L. O.
NGET					
Types of Radiation (NGET)			27		

Material Required for Examination none

Question Source: New **Question Modification Method:**

Question Source Comments:

Comment Type	Comment

Record Number: 107 **RO Number:** 84 **SRO Number:** 82

Question Topic ACCIDENTAL GASEOUS RADWASTE RELEASE

On a system walkdown, ABNORMAL bubbling is observed emanating from a storage cell and breaking the surface of the spent fuel pool.

ersonnel near the Spent Fuel Pool should be directed to . . .

a. Evacuate the area immediately.

b. Remain in the area until rad protection surveys the area.

c. Remain in the area ONLY if respirators are donned.

d. Evacuate the area ONLY if the FHB Incident rad monitors alarm.

Answer	a	**Exam Level**	S	**Cognitive Level**	Memory	**Facility:**	Braidwood	**ExamDate:**	10/29/01

Tier:	Emergency and Abnormal Plant Evolutions	**RO Group**	2	**SRO Group**	2

060	Accidental Gaseous Radwaste Release		
2.3	Radiation Control		
2.3.2	Knowledge of facility ALARA program.	2.5	2.9

Explanation of Answer Per the reference, A. is the only correct answer. ALARA principles disagree with remaining in the area until surveys are taken or donning respirators. D. Incorrect, ALARA principles imply that if rad levels are changing, maximize distance from the problem area, don't wait for an alarm.

Reference Title	Facility Reference Number	Section	Page Number(s)	Revision	L. O.
Fuel Handling Emergency Fuel Handling Emergency	1BwOA REFUEL-1	B.1), and step 1	1,2	54	
Fuel Handling Emergency	1BOA REFUEL-1	step 1 B	2	101	

aterial Required for Examination None

Question Source: New **Question Modification Method:**

Question Source Comments:

Comment Type	Comment

Record Number: 108 **RO Number:** **SRO Number:** 83

Question Topic ACCIDENTAL GASEOUS RADWASTE RELEASE

A rupture of the ON LINE Gas Decay Tank has occurred, and the effluent is escaping though the Plant Vent Stack.

As the ALERT setpoint is exceeded for the ON LINE Vent Stack Effluent Rad Monitor, 1PR28J, the RM-11 indications for the channels of this monitor will respond by . . .

a. REMAINING GREEN and ON LINE.

b. CHANGING to YELLOW and REMAINING ON LINE.

c. CHANGING to CYAN and GOING OFF LINE.

d. CHANGING to DARK BLUE and GOING OFF LINE.

Answer	b	**Exam Level**	B	**Cognitive Level**	Memory	**Facility:**	Braidwood	**ExamDate:**	10/29/01

Tier:	Emergency and Abnormal Plant Evolutions	**RO Group**	2	**SRO Group**	2

060	Accidental Gaseous Radwaste Release		
AK2.	Knowledge of the interrelations between Accidental Gaseous Radwaste Release and the following:		
AK2.01	ARM system, including the normal radiation-level indications and the operability status	2.6	2.9*

Explanation of Answer A. Incorrect, color change occurs as Alert setpoint is reached. B. Correct. C. Incorrect, Cyan represents equipment failure, no detector equipment failed. D. Incorrect, dark blue represents operate failure. Detector is stil operatble with elevated rad effluent flowing past.

Reference Title	Facility Reference Number	Section	Page Number(s)	Revision	L. O.
Horse Notes- Rad monitoring	AR-1	Color Codes		0	
Using the RM-11 AR Guidelines	BwOP AR/PR-11	F.	2	5E2	

Material Required for Examination none

Question Source: New **Question Modification Method:**

Question Source Comments:

Comment Type	Comment

Record Number: 109 **RO Number:** 85 **SRO Number:** 84

Question Topic ARM SYSTEM ALARMS

Why should an ELEVATED rad level on a Main Steam Line rad monitor be confirmed by a chemistry sample?

levated Main Steam Line Rad indications will be caused by . . .

a. Increasing temperatures in the MSIV room.

b. Small Break LOCA inside containment.

c. Main steam line isolation.

d. Feedwater isolation.

Answer	a	**Exam Level**	B	**Cognitive Level**	Memory	**Facility:**	Braidwood	**ExamDate:**	10/29/01

Tier:	Emergency and Abnormal Plant Evolutions	**RO Group**	2	**SRO Group**	2

061	Area Radiation Monitoring (ARM) System Alarms		
AK3.	Knowledge of the reasons for the following responses as they apply to Area Radiation Monitoring System:		
AK3.02	Guidance contained in alarm response for ARM system	3.4	3.6

Explanation of Answer Elevated temperatures in the MSIV room from a steam leak will cause elevated rad levels to be indicated on Area Rad monitors. A. Correct. B, C, and D Incorrect, none of these events raise MSIV room temperature, nor cause increased activity in the steam lines.

Reference Title	Facility Reference Number	Section	Page Number(s)	Revision	L. O.
Alarm Response procedure	BwAR 1-2AR022J	D.2	1	2	
Faulted SG Isolation procedure	1BwEP-2	Note prior to step 6	9	1A, WOG 1C	

Material Required for Examination None

Question Source:	New	**Question Modification Method:**	

Question Source Comments:

Comment Type	Comment

Record Number:	110	**RO Number:**	86	**SRO Number:**	85

Question Topic	LOSS OF NUCLEAR SERVICE WATER

Both Units are at 100% Reactor power.
1A SX pump is under a Clearance Order/Out of Service for Impeller work.

/hich ONE of the following would have the MOST restrictive tech spec time clock for Unit 1?

Hanging a Clearance Order/Out of Service on . . .

a. 1B SX pump.

b. 2A SX pump.

c. 2B SX pump.

d. 2SX005, SX Unit Cross-Tie valve.

Answer	a	Exam Level	S	Cognitive Level	Comprehension	Facility:	Braidwood	ExamDate:	10/29/01

Tier:	Emergency and Abnormal Plant Evolutions	RO Group	1	SRO Group	1

062	Loss of Nuclear Service Water		
2.2	Equipment Control		
2.2.17	Knowledge of the process for managing maintenance activities during power operations.	2.3	3.5

Explanation of Answer: Taking the second SX pump out of service on the same unit places the unit in a condition outside the specific spec (i.e. 3.0.3). Therefore A is correct. B and C Incorrect, because unit 2 would enter a 72 hour clock, but that is not the most restrictive, nor does it impact unit 1. D Incorrect , it places both units in a 72 hour clock for inability to crosstie, but is not the most limiting action for unit 1.

Reference Title	Facility Reference Number	Section	Page Number(s)	Revision	L. O.
Tech spec	3.7.8 Essential Service Water Systems	3.7.8 Cond A. , and B	3.7.8-1, 2	98	

Material Required for Examination	Tech Spec 3.7.8

Question Source:	New	Question Modification Method:	

Question Source Comments:	

Comment Type	Comment

Record Number:	111	RO Number:		SRO Number:	86

Question Topic LOSS OF NUCLEAR SERVICE WATER

An extended loss of all AC power has occurred and the crew is placing equipment in PULL OUT to inhibit automatic loading of the AC Emergency Buses per the Attachment for Recovery from an Extended LOSS OF ALL AC POWER procedure.

Which pump Control switches will be left in normal after trip (NAT), and why?

a. One charging pump on either train, to provide RCP sealing cooling.

b. One charging pump on either train to provide RCS inventory makeup.

c. One essential service water pump on either train to provide emergency diesel generator cooling.

d. One essential service water pump on either train to provide charging pump lube oil cooling.

Answer c **Exam Level** B **Cognitive Level** Memory **Facility:** Braidwood **ExamDate:** 10/29/01

Tier: Emergency and Abnormal Plant Evolutions **RO Group** 1 **SRO Group** 1

062 Loss of Nuclear Service Water

AK3. Knowledge of the reasons for the following responses as they apply to Loss of Nuclear Service Water:

AK3.03 Guidance actions contained in EOP for Loss of nuclear service water 4.0 4.2

Explanation of Answer A. Incorrect, because initiating seal cooling after seal overheating will further damage the seals. B. Incorrect, at this point in the procedure, limited electrical sources are being made available. Loading of these sources is controlled manually by defeating the sequencer. C. Correct, restoring a DG is the most likely source of power. Leaving the SX pump available for auto start is appropriate. D. Incorrect, although a plausible distractor due to recent modifications to ensure a loss of SX does not result in a core damage sequence. (PSA).

Reference Title	Facility Reference Number	Section	Page Number(s)	Revision	L. O.
3wCA-0.0 Loss of All Ac Power, Att. B	Recovery Actions for extended loss of all AC power	Step 1.b. and Caution.	57	1, WOG1 C	

Material Required for Examination None

Question Source: Other Facility **Question Modification Method:** Significantly Modified

Question Source Comments: Millstone 3 2000 NRC exam

Comment Type	Comment

Record Number: 112 **RO Number:** 87 **SRO Number:** 87

Question Topic LOSS OF INSTRUMENT AIR

The following conditions exist on Unit 1:

- 100% Reactor power.
- All systems and controls are in AUTOMATIC.
- An Instrument Air line leak is causing header pressure to DECREASE.
- Air operated valves are repositioning to their loss of air positions.

Assuming NO operator actions,
which ONE of the following air line leak locations will cause a unit shutdown FIRST?

a. Letdown line air header.

b. Auxiliary Feedwater Flow Control Valve header.

c. Charging Flow Control Valve header.

d. Feed Regulating Valve header.

Answer d **Exam Level** S **Cognitive Level** Memory **Facility:** Braidwood **ExamDate:** 10/29/01

Tier: Emergency and Abnormal Plant Evolutions **RO Group** 3 **SRO Group** 2

065 Loss of Instrument Air

AA2. Ability to determine and interpret the following as they apply to Loss of Instrument Air:

AA2.05 When to commence plant shutdown if instrument air pressure is decreasing 3.4* 4.1

Explanation of Answer Per the reference, a loss of air to the FRVs will result in a Reactor Trip on Lo-2 SG level. A. Incorrect a loss of letdown will not cause a reactor trip. B. Incorrect, a loss of air to the AF005s will cause the valves to fail open, and at power there is no flow through them. C. Incorrect, Charging flow will increase pzr level, but the loss of feed will cause a trip first. D. Correct.

Reference Title	Facility Reference Number	Section	Page Number(s)	Revision	L. O.
Loss of Instrument Air	1BwOA SEC-4	Table A	16, 19, 20	3A	
Loss of Instrument Air	1BOA SEC-4	Table A	7	101	

Material Required for Examination none

Question Source: New **Question Modification Method:**

Question Source Comments:

Comment Type	Comment

Record Number: 113 **RO Number:** **SRO Number:** 88

Question Topic LOSS OF CONTAINMENT INTEGRITY

The following conditions exist on Unit 1:

- Reactor tripped from 100% power due to a S/G Tube Rupture and RCS LOCA. Containment Integrity has been breached.
- The crew is at step 11 of 1BwCA-3.1, SGTR with LOCA, Subcooled Recovery Desired.
- RWST level is 54% and slowly DECREASING.
- Containment pressure is 5 psig.
- Ruptured S/G level is 43% Narrow Range
- Containment Floor Water level (1LI-PC006/007) is 3 inches.
- ALL systems and components are available and responding as designed.

The NSO can expect the crew to . . .

a. Consult the TSC to determine if recovery should be completed using the SGTR with LOCA, Saturated Recovery Desired procedure (1BwCA-3.2).

b. Transition to the SGTR with LOCA, Saturated Recovery Desired procedure (1BwCA-3.2), without consulting the TSC since the requirements are met.

c. Remain in the SGTR with LOCA, Subcooled Recovery procedure (1BwCA-3.1), without consulting the TSC since the requirements are met.

d. Transiton to the SGTR procedure (1BwEP-3), since an unisolated Steam Generator Tube Rupture exists.

Answer b **Exam Level** R **Cognitive Level** Application **Facility:** Braidwood **ExamDate:** 10/29/01

Tier Emergency and Abnormal Plant Evolutions **RO Group** 1 **SRO Group** 1

069 Loss of Containment Integrity

2.1 Conduct Of Operations

2.1.25 Ability to obtain and interpret station reference materials such as graphs, monographs, and tables which contain performance data. 2.8 3.1

Explanation of Answer Given the reference, RWST level, and indicated floor water level places the operating point in the "Saturated Recovery Appropriate" area of the graph. A. Incorrect, Ruptured S/G level is given as > 81% (adverse) so the RNO for step 11b is not entered. B. Correct, all conditions met. C. Incorrect, given conditions are not indicative of a subcooled recovery per the graph. D. Incorrect, no transition to EP-3 is provided in the step.

Reference Title	Facility Reference Number	Section	Page Number(s)	Revision	L. O.
SGTR with LOCA Subcooled Recovery Desired	1BwCA-3.1	Step 11	18	1A, WOG 1C	
Cnmt floor water level vs RWSt level	Fig 1BwCA-3.1-3	Sat Recocery Appropriate	45	1A WOG 1C	

Material Required for Examination 1BwCA-3.1 step 11, and fig 1BwCA-3.1-3

Question Source: New **Question Modification Method:**

Question Source Comments:

Comment Type	Comment

Record Number: 114 | RO Number: 88 | SRO Number:

Question Topic: INADEQUATE CORE COOLING

Which ONE of the following groups of instruments input to the Subcooling Margin Monitor (SMM)?

a. Train 'A' or 'B' (whichever is higher) Average of the 10 HIGHEST CETCs and Wide Range RCS Pressure.

b. 10 HIGHEST CETCs and Wide Range RCS Pressure.

c. Average of the RCS Loop Wide Range T Hots and Pressurizer Pressure.

d. Average of the RCS Loop Wide Range T Hots and Wide Range RCS Pressure.

Answer: b | Exam Level: B | Cognitive Level: Memory | Facility: Braidwood | ExamDate: 10/29/01

Tier: Emergency and Abnormal Plant Evolutions | RO Group: 1 | SRO Group: 1

074 Inadequate Core Cooling

EA1. Ability to operate and / or monitor the following as they apply to Inadequate Core Cooling:

EA1.12 RCS temperature and pressure indicators 4.1 4.4

Explanation of Answer: A. Incorrect, Subcooling may be calculated using these inputs, but the individual trains are not used in the SMM calculation. B. Correct. C. Incorrect, Neither input is used. D. Incorrect, Thots are not used.

Reference Title	Facility Reference Number	Section	Page Number(s)	Revision	L. O.
Horse Notes Inadequate Core Cooling	CORE-2, Inadequate Core Cooling	SMM		1	
Inadequate Core Cooling lesson plan ch 34b	I1-CX-XL-01		9		

Material Required for Examination: none

Question Source: New | Question Modification Method:

Question Source Comments:

Comment Type	Comment

Record Number: 115 | RO Number: 89 | SRO Number: 89

Question Topic	REDIAGNOSIS

Initially, the following conditions existed on Unit 1:
- 100% Reactor power.

Subsequently, the following occurred:
- A Reactor Trip coincident with a loss of Instrument Bus 114.
- All systems respond as expected after the trip.

With NO operator action, 5 minutes after the trip S/G levels will be . . .

a. HIGHER than normal post trip response due to a delay in ISOLATING AFW flow and the Rediagnosis procedure 1BwEP ES-0.0 should be used.

b. HIGHER than normal post trip response due to a delay in ISOLATING AFW flow and the Rediagnosis procedure 1BwEP ES-0.0 should NOT be used.

c. LOWER than normal post trip response due to DECREASED AFW flow and the Rediagnosis procedure 1BwEP ES-0.0 should be used.

d. LOWER than normal post trip response due to DECREASED AFW flow and the Rediagnosis procedure 1BwEP ES-0.0 should NOT be used.

Answer	d	Exam Level	B	Cognitive Level	Comprehension	Facility:	Braidwood	ExamDate:	10/29/01

Tier:	Emergency and Abnormal Plant Evolutions	RO Group	2	SRO Group	1

E01	Rediagnosis		
EK2.	Knowledge of the interrelations between Rediagnosis and the following:		
EK2.2	Facility's heat removal systems, including primary coolant, emergency coolant, the decay heat removal systems, and relations between the proper operation of these systems to the operation of the facility.	3.5	3.8

Explanation of Answer

A loss of instrument bus 114 will cause the B Train AFW flow control valves to close after flow is sensed through them. The B AFW pump will start on AMS. This reduces the total AFW flow to the S/Gs, reducing post trip level response to just one train of AFW vice two. Use of Rediagnosis is limited to those times when an SI is actuated or required. No SI is needed in this case, and has not actuated. A, B Incorrect, plausible if the AFW flow control valves were to fail open vice close. C. Incorrect Rediagnosis does not apply. D. Correct.

Reference Title	Facility Reference Number	Section	Page Number(s)	Revision	L. O.
Loss of Instrument Bus	1BwOA ELEC-2	Table D	18	7A	
Rediagnosis	1BwEP ES-0.0	Purpose	1		

Material Required for Examination	None

Question Source:	New	Question Modification Method:	

Question Source Comments:	

Comment Type	Comment

Record Number:	116	RO Number:	90	SRO Number:	90

Question Topic	REDIAGNOSIS

In the REDIAGNOSIS procedure, 1BwEP ES-0.0, SG level is checked INCREASING in an UNCONTROLLED manner in ANY Steam Generator to determine if . . .

a. ANY SG secondary pressure boundary is intact.

b. An adequate secondary heat sink exists.

c. SG tubes are ruptured.

d. RCS pressure boundary is intact.

Answer	c	Exam Level	B	Cognitive Level	Comprehension	Facility:	Braidwood	ExamDate:	10/29/01

Tier:	Emergency and Abnormal Plant Evolutions	RO Group	2	SRO Group	1

E01	Rediagnosis		
EK3.	Knowledge of the reasons for the following responses as they apply to Rediagnosis:		
EK3.1	Facility operating characteristics during transient conditions, including coolant chemistry and the effects of temperature, pressure, and reactivity changes and operating limitations and reasons for these operating characteristics.	3.0	3.3

Explanation of Answer

A. Incorrect, per Reference. Secondary pressure boundaries are checked in All S/Gs to determine if All SGs are faulted or any SG is non faulted. B. Incorrect, All SG Secondary Pressure boundaries are checked to determine if any SG is faulted. C. Correct, Tube integrity is checked by determining if any SG level is increasing in an uncontrolled manner, or if any abnormal radiation exists in the secondary. D. Incorrect, the integrity of the RCS pressure boundary is evaluated by process of elimination. If no faults, and no ruptures, and SI is necessary, then the problem is the RCS.

Reference Title	Facility Reference Number	Section	Page Number(s)	Revision	L. O.
Rediagnosis	1BwEP ES-0.0	Step 1, 2,3	2,3	1 WOG 1C	
Rediagnosis	1BEP ES-0.0	Steps 1,2,3	2	100, WOG 1C	

Material Required for Examination	None

Question Source:	New	Question Modification Method:	

Question Source Comments:	

Comment Type	Comment

Record Number:	117	RO Number:	91	SRO Number:	91

Question Topic	SI TERMINATON

Which ONE of the following describes the action the operator should take upon determining pressure in the 1A Steam Generator (unisolated) is deceasing UNCONTROLLABLY while in 1BwEP ES-1.1 "SI TERMINATION"?

a. Shut all MSIVs, SG PORVS, and ISOLATE Main Feedwater, Auxiliary Feedwater, Sampling and Blowdown Lines.

b. Initiate Operator Action Summary (OAS) and transition to 1BwEP-2, FAULTED STEAM GENERATOR ISOLATION.

c. Initiate OPERATOR ACTION SUMMARY (OAS) and transition to 1BwEP-1 LOSS OF REACTOR OR SECONDARY COOLANT.

d. Verify all Steam Generator PORVs and steam dumps are shut, then shut all MSIVs.

Answer	b	Exam Level	R	Cognitive Level	Comprehension	Facility:	Braidwood	ExamDate:	10/29/01

Tier:	Emergency and Abnormal Plant Evolutions	RO Group	2	SRO Group	1

E02	SI Termination		
EA2.	Ability to determine and interpret the following as they apply to SI Termination:		
EA2.2	Adherence to appropriate procedures and operation within the limitations in the facility's license and amendments.	3.5	4.0

Explanation of Answer: B. Correct. OAS clearly states go to EP-2 for conditions given. C. Incorrect. EP-1 is entered only if SI is re-initiated. A. and D. Incorrect. Shuttting valves and isolating FW and MS are directed within EP-2.

Reference Title	Facility Reference Number	Section	Page Number(s)	Revision	L. O.
SI Termination	ES-1.1	OAS			
SI Termination LP	EP-XL-02				1

Material Required for Examination	None

Question Source:	Previous 2 NRC Exams	Question Modification Method:	Direct From Source

Question Source Comments:	1999 Braidwod NRC exam

Comment Type	Comment

Record Number:	118	RO Number:	92	SRO Number:	

Question Topic PTS

A steam line break occurred 10 minutes ago in the Turbine Building while at 100% power.
All MSIVs failed OPEN.

The following conditions exist on the Unit:

- All SG Wide Range Levels are 8% and DECREASING.
- ALL RCS Loop T Cold Temperatures indicate 190 degrees F.
- AFW flow to each SG is 45 gpm.
- All RCPs are stopped.
- RCS Pressure is 600 psig.

Which ONE of the following describes the consequences of this accident and the actions to be taken?

a. A Loss of Forced Circulation is causing a challenge to core cooling, maximize AFW flow to the Steam Generators.

b. A Loss of Heat Sink is causing the RCS to repressurize, maximize AFW flow to the Steam Generators.

c. Natural Circulation has been stopped by the injection of Accumulator Nitrogen, start at least ONE RCP.

d. Pressurized Thermal Shock is imminent, stop ECCS pumps.

Answer d **Exam Level** R **Cognitive Level** Application **Facility:** Braidwood **ExamDate:** 10/29/01

Tier: Emergency and Abnormal Plant Evolutions **RO Group** 1 **SRO Group** 1

'8 Pressurized Thermal Shock

EK1. Knowledge of the operational implications of the following concepts as they apply to Pressurized Thermal Shock:

EK1.3 Annunciators and conditions indicating signals, and remedial actions associated with the (Pressurized Thermal Shock). 3.5 4.0

Explanation of Answer D. Correct. T Cold less than 240 degrees meets entry conditions for FR P.1 where RCS pressure is to be reduced. A. and B. Incorrect. Increasing AFW flow would aggravate the cooldown. C. Incorrect. RCS Pressure is too high to allow nitrogen injection.

Reference Title	Facility Reference Number	Section	Page Number(s)	Revision	L.O.
Status Trees	1BwST-4 Integrity				
Response to Imminent PTS	1BwFR-P.1	step 9.			

Material Required for Examination none

Question Source: Previous 2 NRC Exams **Question Modification Method:** Significantly Modified

Question Source Comments: 1999 Braidwod NRC Exam

Comment Type	Comment

Record Number: 119 **RO Number:** 93 **SRO Number:**

Question Topic PTS

The intent of the major action steps performed in 1BwFR-P.1 is to . . .

a. INCREASE the RCS cooldown and DECREASE RCS pressure.

b. INCREASE the RCS cooldown and STABILIZE RCS pressure.

c. STOP the RCS cooldown and STABILIZE RCS pressure.

d. STOP the RCS cooldown and DECREASE RCS pressure.

Answer d **Exam Level** B **Cognitive Level** Memory **Facility:** Braidwood **ExamDate:** 10/29/01

Tier: Emergency and Abnormal Plant Evolutions **RO Group** 1 **SRO Group** 1

E08 Pressurized Thermal Shock

EK3. Knowledge of the reasons for the following responses as they apply to Pressurized Thermal Shock:

EK3.3 Manipulation of controls required to obtain desired operating results during abnormal, and emergency situations. 3.7 3.8

Explanation of Answer A.and B. Incorrect, increasing the cooldown will increase the thermal stress. C. Incorrect, leaving pressure as is, adds stress. D. Correct, stopping the cooldown stops adding more thermal stress, and decreasing pressure, reduces the tensile/compressive stress.

Reference Title	Facility Reference Number	Section	Page Number(s)	Revision	L. O.
Response to Imminent PTS Conditon	1BwFR-P.1	steps 2,13, and 15	3,11,14	1A, WOG 1C	

Material Required for Examination None

Question Source: Facility Exam Bank **Question Modification Method:** Direct From Source

Question Source Comments:

Comment Type	Comment

Record Number: 120 **RO Number:** 94 **SRO Number:** 92

Question Topic	NATURAL CIRCULATION OPERATIONS

A loss of power occurred forcing a Natural Circulation Cooldown to be performed per 1BwEP ES-0.2, "NATURAL CIRCULATION COOLDOWN". An RCP has been started.

The following indications are observed 1 minute after starting the RCP:

- RCS Loop Flow has INCREASED.
- Seal DP 250 psig on the running RCP.
- 850 amps for the running RCP.
- RCP vibrations 2 mils on the running RCP.

What should the operator do next?

a. Start an additional RCP.

b. Verify Seal Leakoff Isolation valve OPEN.

c. Contact System Engineering to monitor vibrations.

d. Trip the RCP.

Answer	d	Exam Level	B	Cognitive Level	Application	Facility:	Braidwood	ExamDate:	10/29/01

Tier:	Emergency and Abnormal Plant Evolutions	RO Group	1	SRO Group	1

E09	Natural Circulation Operations		
EA1.	Ability to operate and / or monitor the following as they apply to Natural Circulation Operations:		
EA1.1	Components, and functions of control and safety systems, including instrumentation, signals, interlocks, failure modes, and automatic and manual features.	3.5	3.5

Explanation of Answer	D. Correct. Limits stated in the reference prohibit continued RCP operation if amps don't decrease to less than 650 within 35 seconds of starting. B. Incorrect. Seal DP must exceed 200 psig to continue operating an RCP. C. Incorrect. The vibration limit for monitoring is greater than 3 mils. As long as loop flow increased within 20 seconds continued operations is allowed. A. Incorrect. Implies leaving the running pump running, when it should be tripped due to current draw.

Reference Title	Facility Reference Number	Section	Page Number(s)	Revision	L. O.
RCP Startup During Abnormal Conditions	1BwOA ESP-1	Steps 6, 7	4-6	0	
Startup of an RCP	BOP RC-1				

Material Required for Examination	None

Question Source:	New	Question Modification Method:	

Question Source Comments:	

Comment Type	Comment

Record Number:	121	RO Number:	95	SRO Number:	93

Question Topic	NATURAL CIRCULATION WITH STEAM VOID IN VESSEL WITH/WITHOUT RVLIS

A Reactor Trip from 100% power and a Loss of Offsite Power occurred 1 hour ago. The following conditions exist:

1BwEP-ES-0.3, NATURAL CIRCULATION COOLDOWN WITH STEAM VOID IN VESSEL (WITH RVLIS) is in progress.
- All NON-ESF buses are still DE-ENERGIZED.
- PZR Level is stable at 50%.
- Letdown is established.
- Charging is in MANUAL Control.
- Pressurizer Pressure indicates 800 psig.
- Pressure control is via the Aux Spray Valve.
- CETCs indicate 520 degrees F.
- RVLIS indicates 81% Plenum level.

The Aux spray valve inadvertently sticks OPEN causing a DECREASE in RCS pressure.

RVLIS indication _____(1)____ and Pressurizer Level indication ____(2)____.

	(1)	(2)
a.	DECREASES	DECREASES.
b.	DECREASES	INCREASES.
c.	INCREASES	DECREASES.
d.	INCREASES	INCREASES.

Answer	b	Exam Level	B	Cognitive Level	Comprehension	Facility:	Braidwood	ExamDate:	10/29/01

Tier:	Emergency and Abnormal Plant Evolutions	RO Group	1	SRO Group	1

E10	Natural Circulation with Steam Void in Vessel with/without RVLIS		
EK2.	Knowledge of the interrelations between Natural Circulation with Steam Void in Vessel with/without RVLIS and the following:		
EK2.2	Facility's heat removal systems, including primary coolant, emergency coolant, the decay heat removal systems, and relations between the proper operation of these systems to the operation of the facility.	3.6	3.9

Explanation of Answer: B. Correct. With charging in manual, the excessive spray will decrease RCS Pressure. No NON ESF power means no vessel head cooling from CRDM fans. A decrease in RCS pressure will cause void growth at the given conditons so RVLIS decreases. No additional heat is removed from the RCS , so with charging in Manual, and voids increasing, pzr level increases.

Reference Title	Facility Reference Number	Section	Page Number(s)	Revision	L. O.
Background Document for Natural Circ C/D.					

Material Required for Examination	Figure 1BwEP ES-0.3, RCS Subcooling Margin +22 degrees F.

Question Source:	New	Question Modification Method:	

Question Source Comments:	

Comment Type	Comment

Question Topic	LOSS OF EMERGENCY COOLANT RECIRCULATION

The following conditions exist on Unit 1:

- A loss of coolant accident has occurred.
- RWST Level is 35% and DECREASING.
- 1BwCA-1.1, LOSS OF EMERGENCY COOLANT RECIRCULATION is in progress.
- 1B RH pump has TRIPPED on overcurrent.
- Attempts are being made to establish Cold Leg Recirculation capability.
- SI has been RESET.
- The NSO is questioning the ECCS valve alignment.

Which ONE of the following is PREVENTING 1SI8811A, Train A SI Recirc Sump Isolation valve from being MANUALLY OPENED?

a. 1SI8812A, Train A RWST to RH Suction valve is OPEN.

b. 1SI8812A, Train A RWST to RH Suction valve is CLOSED.

c. 1CS001A, Train A RWST to CS Suction valve is CLOSED.

d. 1CS009A, Train A Containment Recirc Sump to CS Suction valve is OPEN.

Answer	a	Exam Level	B	Cognitive Level	Memory	Facility:	Braidwood	ExamDate:	10/29/01

Tier:	Emergency and Abnormal Plant Evolutions	RO Group	2	SRO Group	2

E11	Loss of Emergency Coolant Recirculation		
EA1.	Ability to operate and / or monitor the following as they apply to Loss of Emergency Coolant Recirculation:		
EA1.1	Components, and functions of control and safety systems, including instrumentation, signals, interlocks, failure modes, and automatic and manual features.	3.9	4.0

Explanation of Answer	A Correct. SI8812A must be closed to manually open SI8811A. The CS009 must be closed to open CS001, and SI8811 must be open to open CS009. But there is no interlock for the CS009 to open the SI8811.

Reference Title	Facility Reference Number	Section	Page Number(s)	Revision	L. O.
Transfer to CLR	1BwEP ES-1.3	Att. A Step 3	11	1A WOG 1C	
MCB Valve Interlocks	1BwGP 100-1A3		1, 3		

Material Required for Examination	None

Question Source:	New	Question Modification Method:	

Question Source Comments:	

Comment Type	Comment

Record Number:	123	RO Number:	97	SRO Number:	95

Question Topic	UNCONTROLLED DEPRESSURIZATION OF ALL STEAM GENERATORS

Given the following information concerning Unit 1:

- An unisolable steam break inside of containment has occurred and All MSIVs are OPEN.
- 1BwCA-2.1, UNCONTROLLED DEPRESSURIZATION OF ALL SGs, is in progress.
- Containment pressure is 8 psig and DECREASING slowly after peaking at 37 psig.
- ALL wide range SG levels are <10% and DECREASING.
- Feed Flow to each SG has been REDUCED to 45 gpm by operator action.
- RCS Pressure is 1800 psig and INCREASING.

The STA has just updated the crew and a decision is about to be made concerning which procedure to perform. The Unit Supervisor needs recommendations and reasons.

The crew should . . .

a. Transition to 1BwFR-H.1, LOSS OF HEAT SINK, and perform the Bleed and Feed Steps to transfer the heat sink to the PZR Porvs and prevent over heating the core.

b. Transfer to 1BwFR-H.1, LOSS OF HEAT SINK, and INCREASE feed flow to GREATER THAN 500 gpm until at least ONE SG narrow range level is GREATER THAN 31%.

c. Continue in 1BwCA-2.1, UNCONTROLLED DEPRESSURIZATION OF ALL STEAM GENERATORS, and INCREASE feed flow to GREATER THAN 500 gpm, until at least ONE SG narrow range level is GREATER THAN 31%.

d. Continue in 1BwCA-2.1, UNCONTROLLED DEPRESSURIZATION OF ALL STEAM GENERATORS, and control feed flow to maintain SGs in a wet condition.

Answer: d | Exam Level: B | Cognitive Level: Application | Facility: Braidwood | ExamDate: 10/29/01

Tier: Emergency and Abnormal Plant Evolutions | RO Group: 1 | SRO Group: 1

E12	Uncontrolled Depressurization of all Steam Generators		
EK3.	Knowledge of the reasons for the following responses as they apply to Uncontrolled Depressurization of all Steam Generators:		
EK3.4	RO or SRO function as a within the control room team as appropriate to the assigned position, in such a way that procedures are adhered to and the limitations in the facilities license and amendments are not violated.	3.5	3.8

Explanation of Answer: D Correct. Directions in CA-2.1 reduce feed flow to 45 gpm /sg max to keep the tubes wet. A. and B. Incorrect. Caution in FR-H.1 directs not performing procedure if feed flow has been reduced per operator action. C. Incorrect. Increasing feed flow to > 500 gpm will aggravate a PTS situation.

Reference Title	Facility Reference Number	Section	Page Number(s)	Revision	L. O.
Loss of Heat Sink	1BwFR-H.1	Caution prior to step 1	2	100 WOG 1C	
Uncotrolled Depressurizatrion of all SGs	1BwCA-2.1	Caution prior to step 2	7	1A WOG 1C	

Material Required for Examination: None

Question Source: Previous 2 NRC Exams | Question Modification Method: Significantly Modified

Question Topic	HIGH CONTAINMENT PRESSURE

While operating Unit 1 at 100% power, with all systems normally aligned,
a transient occurred that resulted in the following:

- LOCA with reactor trip and SI.
- The Crew has progressed through the appropriate procedures to 1BwCA-1.1, LOSS OF EMERGENCY COOLANT RECIRCULATION.
- RWST level is 46% and DECREASING.
- NO Containment Spray pumps are running.
- The STA has just identified an ORANGE path on the Containment Critical Safety Function Status Tree for containment pressure.

Which ONE of the following is the REQUIRED amount of Containment Cooling Systems equipment that must be OPERATING?

a. 1 RCFCs and 2 Containment Spray pumps.

b. 2 RCFCs and 0 Containment Spray pumps.

c. 3 RCFCs and 0 Containment Spray pumps.

d. 4 RCFCs and 1 Containment Spray pump.

Answer	Exam Level	Cognitive Level	Facility:	ExamDate:
c	S	Comprehension	Braidwood	10/29/01

Tier:	RO Group	SRO Group
Emergency and Abnormal Plant Evolutions	1	1

E14	High Containment Pressure		
EA2.	Ability to determine and interpret the following as they apply to High Containment Pressure:		
A2.2	Adherence to appropriate procedures and operation within the limitations in the facility's license and amendments.	3.3	3.8

Explanation of Answer: All combinations of distractors are on the chart in the procedure. B. Correct, represents a MINIMUM combination.

Reference Title	Facility Reference Number	Section	Page Number(s)	Revision	L. O.
Loss of emergency Coolant Recirculation	1BwCA-1.1	Step 9 c.	8	100	

Material Required for Examination: Copy of page 8 (table) of 1BwCA-1.1 rev. 100.

Question Source: New | **Question Modification Method:** Concept Used

Question Source Comments: New stem / premise. New answer.

Comment Type	Comment

Record Number: 125 | **RO Number:** | **SRO Number:** 97

Question Topic	HIGH CONTAINMENT PRESSURE

A component believed to be causing a containment pressure increase has been repositioned to reduce the frequency of containment venting.
The component is NOT Tech Spec related.
his component is NOT on any FORMAL EXEMPTION list.

What is the MAXIMUM time the component can be kept in the Abnormal Component Position Log before a 10CFR50.59 Safety Evaluation Screening must be performed?

a. 1 month.

b. 3 months.

c. 6 months.

d. 1 year.

Answer	c	Exam Level	S	Cognitive Level	Memory	Facility:	Braidwood	ExamDate:	10/29/01

Tier:	Emergency and Abnormal Plant Evolutions	RO Group	1	SRO Group	1

E14	High Containment Pressure		
2.2	Equipment Control		
2.2.14	Knowledge of the process for making configuration changes.	2.1	3.0

Explanation of Answer	Per Reference.

Reference Title	Facility Reference Number	Section	Page Number(s)	Revision	L. O.
Operational Configuration Control	OP-AA-101-301	4.1.2.3.E	5	1	

Material Required for Examination	none

Question Source:	New	Question Modification Method:	

Question Source Comments:	

Comment Type	Comment

Record Number:	126	RO Number:		SRO Number:	98

Question Topic CONTAINMENT FLOODING

The following Containment conditions exist on Unit 1 after a LOCA:

- Containment Pressure is 18 psig and slowly INCREASING.
- Containment Floor Water Level is 62 INCHES and STABLE.
- Containment Radiation on 1RT-AR020/21 is GREATER THAN the HIGH ALARM Setpoint.

Based on these conditions, the endpoint of the Containment Status Tree is . . .

a. ORANGE, GO TO 1BwFR-Z.1, Response to High Containment Pressure.

b. ORANGE, GO TO 1BwFR-Z.2, Response to Containment Flooding.

c. YELLOW, GO TO 1BwFR-Z.3, Response to High Containment Radiation Level.

d. GREEN, Satisfied.

Answer b **Exam Level** S **Cognitive Level** Comprehension **Facility:** Braidwood **ExamDate:** 10/29/01

Tier: Emergency and Abnormal Plant Evolutions **RO Group** 3 **SRO Group** 3

E15 Containment Flooding

EA2. Ability to determine and interpret the following as they apply to Containment Flooding:

EA2.1 Facility conditions and selection of appropriate procedures during abnormal and emergency operations. 2.7 3.2

Explanation of Answer A. Incorrect, orange path for pressure starts at 20 psig. B. Correct. 18 psig qualifies Cnmt as Adverse. Orange on floor water level for advese cnmt exists. C. Incorrect, rules of usage for status trees place an orange path at a higher priority than the yellow path on radiation. D. Incorrect, the tree is not satisfied.

Reference Title	Facility Reference Number	Section	Page Number(s)	Revision	L. O.
ontainment Status Tree	1BwST-5 Containment		1	1, WOC 1C	
Use of Procedures	1BwAP 340-2	C.2.c.4)	13	14	

Material Required for Examination 1BwST-5

Question Source: New **Question Modification Method:**

Question Source Comments:

Comment Type	Comment

Record Number: 127 **RO Number:** **SRO Number:** 99

Question Topic CONTAINMENT FLOODING

The following conditions exist of Unit 1:

- The Reactor Cavity is being filled for a refueling outage.
- An inspection of the RCS Loop Nozzle Covers indicates a severe leakage problem.
- Heavy radio traffic is limiting access to a channel to report the leakage.
- Cavity level is decreasing.

To report this leakage the operator should . . .

a. Use the orange emergency call button on the top of his portable radio to call the control room.

b. Wait until the radio traffic is less heavy, then transmit the details over OPS channel 1.

c. Remove the microphone from the radio and and use the "Push to Talk" pushbutton on the side of the radio.

d. Place the "Transmit/Disable" switch in the Disable positon, and transmit the information normally.

Answer a **Exam Level** R **Cognitive Level** Application **Facility:** Braidwood **ExamDate:** 10/29/01

Tier: Emergency and Abnormal Plant Evolutions **RO Group** 3 **SRO Group** 3

E15 Containment Flooding

2.1 Conduct Of Operations

2.1.16 Ability to operate plant phone, paging system, and two-way radio. 2.9 2.8

Explanation of Answer A. Correct. B. Incorrect, transmission during heavy traffic by using the orange emergency call button is the same as dialing 2211. C. Incorrect, microphone removal is accomplished by the NIS Dept Radio coordinator. Its removal in this case will not improve transmitting capability during heavy traffic periods. D. Incorrect, the Disable position, disables transmission capability.

Reference Title	Facility Reference Number	Section	Page Number(s)	Revision	L. O.
900 Mhz Portable Radio Program	BwAP 100-19	C.3, 5, 6	1	0E1	

Material Required for Examination none

Question Source: New **Question Modification Method:**

Question Source Comments:

Comment Type	Comment

Record Number: 128 **RO Number:** 99 **SRO Number:**

Question Topic	HIGH CONTAINMENT RADIATION

Unit 1 has undergone a Small Break LOCA Accident and the operators are carrying out the appropriate actions of the emergency procedures. The following conditions exist:

- 1BwEP ES-1.2 Post LOCA Cooldown and Depressurization is in progress.
- Containment Area Rad Monitors 1RT-AR020 and 1RT-AR021 are at their ALERT Levels.

The applicable Functional Restoration procedure will consider using which ONE of the following pairs of systems?

a. Containment Charcoal Filter Fan and Post-LOCA Purge Exhaust Fan.

b. Post-LOCA Purge Exhaust Fan and Mini-flow Purge Supply Fan.

c. Hydrogen Recombiner and Post-LOCA Purge Exhaust Fan.

d. Mini-flow Purge Supply Fan and Mini-flow Exhaust Fan.

Answer	a	Exam Level	B	Cognitive Level	Memory	Facility:	Braidwood	ExamDate:	10/29/01

Tier:	Emergency and Abnormal Plant Evolutions	RO Group	2	SRO Group	2

E16	High Containment Radiation		
EK1.	Knowledge of the operational implications of the following concepts as they apply to High Containment Radiation:		
EK1.3	Annunciators and conditions indicating signals, and remedial actions associated with the (High Containment Radiation).	3.0	3.3

Explanation of Answer:	Per reference. B. Incorrect, mini flow purge supply fan would is not used except for outages. C. Incorrect, recombiners are used for hydrogen control and not addressed by the FR. D. Incorrect, mini flow is used for pressure control.

Reference Title	Facility Reference Number	Section	Page Number(s)	Revision	L. O.
High Containment Radiation	1BwFR Z.3	Step 3	2	1A WOG 1C	

Material Required for Examination	

Question Source:	New	Question Modification Method:	

Question Source Comments:	

Comment Type	Comment

Record Number:	129	RO Number:	100	SRO Number:	100

ES-401-9 - WRITTEN EXAMINATION REVIEW WORKSHEET

WITH NRC COMMENTS

FOR THE BRAIDWOOD INITIAL EXAMINATION - OCTOBER 2001

Q#	1. LOK (F/H)	2. LOD (1-5)	3. Psychometric Flaws					4. Job Content Flaws				5. Other		6. U/E/S	7. Explanation
			Stem Focus	Cues	T/F	Cred. Dist.	Partial	Job-Link	Minutia	#/ units	Back-ward	Q= K/A	SRO Only		
1	F	2.0										Y	no	~~US~~	~~ROs are required to know entry conditions for tech specs.~~ RO 2.3
2	H	3.5										Y	no	U	System level question. ROs would be expected to have this knowledge. Question deleted, #6 changed to B
3	F	2.5										Y	B	S	
4	H	2.5										Y	S	S	
5	H	3.0										Y	R	S	
6	F	2.5										Y	R	S	Changed to B since #2 deleted
7	H	2.5										Y	B	S	
8	F	2.0										Y	S	S	
9	F	2.0										Y	S	S	
10	F	2.0										Y	B	S	

Instructions

[Refer to Section D of ES-401 and Appendix B for additional information regarding each of the following concepts.]

1. Enter the level of knowledge (LOK) of each question as either (F)undamental or (H)igher cognitive level.
2. Enter the level of difficulty (LOD) of each question using a 1 - 5 (easy - difficult) rating scale (questions in the 2 - 4 range are acceptable).
3. Check the appropriate box if a psychometric flaw is identified:
   - The stem lacks sufficient focus to elicit the correct answer (e.g., unclear intent, more information is needed, or too much needless information).
   - The stem or distractors contain cues (i.e., clues, specific determiners, phrasing, length, etc).
   - The answer choices are a collection of unrelated true/false statements.
   - More than one distractor is not credible.
   - One or more distractors is (are) partially correct (e.g., if the applicant can make unstated assumptions that are not contradicted by stem).
4. Check the appropriate box if a job content error is identified:
   - The question is not linked to the job requirements (i.e., the question has a valid K/A but, as written, is not operational in content).
   - The question requires the recall of knowledge that is too specific for the closed reference test mode (i.e., it is not required to be known from memory).
   - The question contains data with an unrealistic level of accuracy or inconsistent units (e.g., panel meter in percent with question in gallons).
   - The question requires reverse logic or application compared to the job requirements.
5. Check questions that are sampled for conformance with the approved K/A and those that are designated SRO-only (K/A and license level mismatches are unacceptable).
6. Based on the reviewer's judgment, is the question as written (U)nacceptable (requiring repair or replacement), in need of (E)ditorial enhancement, or (S)atisfactory?
7. At a minimum, explain any "U" ratings (e.g., how the Appendix B psychometric attributes are not being met).

THE FIRST 30 QUESTIONS WERE SELECTED FOR THE INITIAL REVIEW
ALL QUESTIONS RECEIVED INDEPENDENT VERIFICATION OF REFERENCES.
ALL QUESTIONS WERE REVIEWED FOR CONFORMANCE WITH K/AS.

Q#	1. LOK (F/H)	2. LOD (1-5)	3. Psychometric Flaws					4. Job Content Flaws				5. Other		6. U/E/S	7. Explanation
			Stem Focus	Cues	T/F	Cred. Dist.	Partial	Job-Link	Minutia	#/ units	Back-ward	Q= K/A	SRO Only		
11	F	2.5						?				Y	B	~~U~~	~~check if ROs are required to know fuel handling at Braidwood~~ NO
12	F	2.0										Y	B	U	station lists question as higher. 25 R TEDE is a memorized limit.
13	F	2.0										Y	S	~~U~~	~~Not an SRO only question. ROs are required to know ALARA.~~ Not required to know management chain.
14	F	2.0										Y	S	S	
15	F	2.0										Y	no	~~U~~S	~~RO knowledge item~~ RO value - 2.1, SRO only
16	F	2.5										Y	B	S	*Facility change*: change 100% reactor power to mode 4 to satisfy Byron Station requirements.
17	F	2.5										Y	R	S	
18	H	3.0										Y	R	U	Station lists question as memory. analysis & comparison required
19	H	3.0										Y	S	~~U~~S	~~check if ROs are required to know explicit procedure entries~~ Yes, for this one.
20	F	3.0										Y	B	~~U~~S	~~station lists question as higher. all correct answer parts memorized~~ higher skill required to arrive at answer
21	F	2.0										Y	B	S	
22	H	2.5										Y	R	S	
23	H	3.0										Y	S	S	
24	F	2.5										N	B	U	~~Q asks effect of differential overcurrent trip, K/A asks effect of rx trip~~ Question & K/A match, however, question is not memory - still unsat
25	H	3.5										Y	B	S	*Facility comment*: make nearest all caps
26	F	2.5										Y	B	S	
27	F	2.5										Y	R	S	
28	F	2.5										Y	R	S	

Q#	1. LOK (F/H)	2. LOD (1-5)	3. Psychometric Flaws					4. Job Content Flaws				5. Other		6. U/E/S	7. Explanation
			Stem Focus	Cues	T/F	Cred. Dist.	Partial	Job-Link	Minutia	#/ units	Back-ward	Q= K/A	SRO Only		
29	H	3.0										Y	B	E	~~Additional information in the stem is needed to clarify filter plugging.~~ Not needed.
30	H	3.5										Y	B	S	*Facility comment*: Delete 2st plant condition & RCS temp of 300°F
31	F	2.0										Y	S	~~U~~S	~~Basis question the ROs should know.~~ Not required knowledge for ROs.
32	H	3.5										Y	R	S	
33	H	3.5										Y	R	S	
34	F	2.5										Y	R	S	
35	F	2.5										Y	B	S	*Facility comment*: change blanet to blanket (typo)
36	F	3.0										Y	R	S	
37	H	3.0										Y	B	S	
38	H	2.5										N	B	~~U~~	~~K/A asks effect on Pzr LCS. Q asks effect on demineralizer.~~ Re-read question, acceptable as is. *Facility comment*: delete "for restart," fix typo decribes to describes.
39	F	2.0										Y	B	E	developes is spelled develops. (first line of question)
40	F	2.5										Y	B	~~U~~S	~~Station says higher. Material appears to be all memorization~~ Some diagnosis is required for the question.
41	H	3.5										Y	R	S	
42	F	2.5										Y	R	S	
43	H	3.0										Y	B	S	
44	H	2.5										Y	B	S	
45	F	2.5										Y	B	S	
46	H	2.0										Y	B	S	
47	H	2.5										Y	B	S	

Q#	1. LOK (F/H)	2. LOD (1-5)	3. Psychometric Flaws					4. Job Content Flaws				5. Other		6. U/E/S	7. Explanation
			Stem Focus	Cues	T/F	Cred. Dist.	Partial	Job-Link	Minutia	#/ units	Back-ward	Q= K/A	SRO Only		
48	F	2.5										Y	R	E	CETCs has should be replaced with CETCs have
49	H	2.5										Y	S	~~U~~S	~~Are ROs required to know this to do their job?~~ Not required
50	H	2.0										Y	B	S	
51	H	2.5										Y	B	S	
52	F	2.0										Y	B	S	
53	F	2.0										Y	B	S	
54	F	2.0										Y	B	S	
55	F	2.0										Y	B	U	station says H, only piece of info necessary is an installed interlock
56	F	2.0										Y	R	S	
57	H	2.5										Y	B	S	*Facility comment*: change b. LESS to "a reduction," d. change LESS to A LOSS of
58	H	2.0										Y	B	S	*Facility comment*: add late cycle (to eliminate +MTC)
59	H	2.0										Y	B	S	
60	H	2.5										Y	B	S	
61	H	2.5										Y	B	S	
62	H	3.0										Y	B	S	
63	F	2.5										Y	B	S	
64	F	2.0										Y	B	S	
65	F	3.0										N	B	U	k/a concerns purpose of load sequencer, Q asks of loads started. *Reviewed k/a, makes no sense. Directed author to replace k/a with A3.07*
66	F	2.0										Y	S	S	

Q#	1. LOK (F/H)	2. LOD (1-5)	3. Psychometric Flaws					4. Job Content Flaws				5. Other		6. U/E/S	7. Explanation
			Stem Focus	Cues	T/F	Cred. Dist.	Partial	Job-Link	Minutia	#/ units	Back-ward	Q= K/A	SRO Only		
67	F	2.0										Y	S	S	
68	F	2.5										Y	R	S	
69	H	2.5										Y	S	S	
70	F	2.0										Y	R	S	
71	F	2.0										Y	B	S	
72	F	2.5										Y	R	S	
73	H	3.0										Y	R	S	
74	F	3.0										Y	S	S	
75	H	2.5										Y	B	S	
76	F	2.0										Y	B	~~S~~U	*Facility comment:* 4 correct answers as submitted. made change to correct & eliminate three.
77	F	2.0										Y	R	S	
78	F	2.0										Y	B	S	
79	H	3.0										Y	B	S	
80	H	3.0										Y	S	S	*Facility comment:* change A to B1, B3 to C
81	H	3.0										Y	B	S	
82	H	2.5										Y	S	~~U~~S	Listed as SRO only - why is RO not required to know this information? *Discussed w/ operations, not required RO knowledge at Braidwood.*
83	H	2.5										Y	B	S	*Facility comment:* change band to bank
84	H	2.5										Y	B	S	
85	H	2.5										Y	S	S	

Q#	1. LOK (F/H)	2. LOD (1-5)	3. Psychometric Flaws					4. Job Content Flaws				5. Other		6. U/E/S	7. Explanation
			Stem Focus	Cues	T/F	Cred. Dist.	Partial	Job-Link	Minutia	#/ units	Back-ward	Q= K/A	SRO Only		
86	H	3.0										Y	S	S	
87	F	2.5										Y	B	S	
88	F	2.0										Y	S	S	
89	H	2.5										Y	B	S	
90	H	2.0										Y	B	S	*Facility Comment*: Change "the active" to "their associated" after loops
91	H	2.5										Y	B	S	
92	F	2.0										N	R	~~U~~S	~~question asks about mode 1, K/A concerns emergency/abnorm evols~~ Reviewed question further, it is sat, changed to B
93	H	2.0										Y	B	S	
94	H	3.0										Y	B	S	
95	H	2.5										Y	B	S	
96	H	3.0										Y	B	S	
97	H	3.0										Y	S	S	*Facility comment*: operablitiy is operability (typo)
98	F	3.0										Y	B	U	station says higher - only requires memorization of setpoints, conflicts with record #98. both test same fundamental issue. *Left as higher with changes made to stem/distractors to fix conflict with record #98.*
99	F	2.5										Y	R	S	
100	F	2.5										Y	B	S	
101	F	2.0										Y	B	S	
102	H	2.5										Y	B	S	
103	H	2.5										Y	B	S	
104	H	2.5										Y	S	S	

Q#	1. LOK (F/H)	2. LOD (1-5)	3. Psychometric Flaws					4. Job Content Flaws				5. Other		6. U/E/S	7. Explanation
			Stem Focus	Cues	T/F	Cred. Dist.	Partial	Job-Link	Minutia	#/ units	Back-ward	Q= K/A	SRO Only		
105	H	2.5										Y	R	S	
106	F	2.0										N	S	U	question asks about release, k/a about accidental release, not S only *Station agreed, allowed change of k/a to generic 2.3.6, SRO only*
107	F	2.0										Y	B	S	
108	F	2.0										Y	S	~~U~~S	~~not S ONLY~~ ROs don't do refuel on the platform.
109	F	2.0										Y	B	S	
110	F	2.5										Y	B	S	
111	H	2.0										Y	S	S	*Facility comment*: change a to an in question stem.
112	F	3.0										Y	B	~~U~~S	is this info required to be reproduced from memory? Required
113	H	3.5										Y	S	U	station says memory, why doesn't the RO need to know this info? Question deleted
114	H	3.5										Y	R	S	
115	F	2.5										Y	B	S	
116	H	3.5										Y	B	S	
117	F	2.5										Y	B	U	station says higher, why is this RO required knowledge? After discussing w/ operations, agree RO required knowledge.
118	H	2.5										Y	R	S	
119	H	3.5										Y	R	S	
120	F	2.5										Y	B	S	
121	H	2.5										N	B	~~U~~S	question deals with RCP run criteria, K/A deals with natural circulation *After discussion, agree k/a & question conform*
122	H	2.5										Y	B	S	
123	F	2.5										Y	B	S	

Q#	1. LOK (F/H)	2. LOD (1-5)	3. Psychometric Flaws					4. Job Content Flaws				5. Other		6. U/E/S	7. Explanation
			Stem Focus	Cues	T/F	Cred. Dist.	Partial	Job-Link	Minutia	#/ units	Back-ward	Q= K/A	SRO Only		
124	H	3.5										Y	B	S	*Facility comment*: change distractor b. Transfer to Transition
125	H	3.0										Y	S	S	
126	F	2.5										Y	S	S	
127	H	2.5										Y	S	S	
128	H	2.0										Y	R	S	
129	F	2.5										Y	B	S	